Appendix A

Process Description

Appendix A –Process Description

1. Introduction

This section briefly describes the incineration train, waste materials fed to the incinerator, and process streams discharged from the incinerator. Also provided is a brief description of system monitoring, as well as a description of anticipated operations during the Test Burn.

2. Incineration System Description

The incineration system consists of a slagging rotary kiln followed by a vertical afterburner chamber (ABC) and a gas conditioning and air pollution control train composed of a spray dryer, baghouse, saturator, and a two-stage packed bed scrubber. A wet electrostatic precipitator (WESP), installed after the scrubber during original construction, is no longer operated.

The incineration system was designed by Ford, Bacon and Davis Utah, Inc., of Salt Lake City, Utah. The rotary kiln design is by Deutsche Babcock Anlagen, West Germany. No model number designation is available since the unit was custom designed.

2.1 Combustion System

The combustion system consists of a slagging rotary kiln and afterburner chamber. The incineration system has a rated heat release of 140 x 106 Btu/hr. The kiln has a diameter of 13.4 feet and is 39.2 feet long. The carbon steel kiln is lined with high temperature resistant brick. The cross-sectional area of the kiln with an eight-inch thick brick lining perpendicular to the direction of gas flow is 114.4 ft^2.

Bulk solid wastes are fed to the rotary kiln at the kiln front wall through the solids feed chute (apron feeder). Drums are fed to the rotary kiln through the solids feed chute using an elevator and feed inlet gate.

Liquid organic wastes from the bulk liquids tank farm and/or auxiliary fuel are fed to the rotary kiln through a single combination burner located in the kiln front wall. Fuel oil and/or liquid organics can be fired at a maximum design rate of 80 MM Btu/hr through the kiln combination burner. The kiln burner is air atomized. Normal operation of the kiln front wall burner requires only a nominal auxiliary fuel rate to maintain a stable flame.

The sludge lance is installed in the kiln front wall, and is a pipe that extrudes waste into the rotary kiln. The direct burn port and an aqueous port are also located in the kiln front wall.

The afterburner is a steel structure lined with refractory. The cross-sectional area of the afterburner chamber is 324.4 ft^2, and the internal dimensions of the afterburner chamber are:

- Width – 17' 3 3/8",
- Depth – 18' 9 ¼", and
- Height (from burner centerline to top) – 36' 5".

Liquid organic wastes from the bulk liquids tank farm and/or auxiliary fuel are fed to the afterburner chamber through two combination burners. The combination burners in the afterburner chamber and in the front wall of the kiln are fully equipped with control systems, flow indicating and recording instruments, and safety systems. Aqueous waste spray nozzles are also located in the afterburner chamber. The aqueous waste nozzles are air atomized. Materials from compressed gas cylinders are also fed to the afterburner.

Following are the calculations to determine maximum combustion gas flow rate through the ABC to maintain a residence time of two (2) seconds.

Chamber Volume

Volume = 18.7708 ft x 17.2813 ft x 36.4167 ft
= 11,813 ft^3

Stack Flow Rate at Residence Time of Two Seconds

Flow Rate = (11,813 ft^3 ÷ 2.0 seconds) x (60 sec/minute)

= 354,390 cfm @ 2,012 °F, 12.5 psi, and 25% moisture

= 354,390 cfm x (68 °F+460) R/(2,012 °F+460) R x (12.5÷14.7) x (1–25/100)

= 48,275 dscfm

2.2 Combustion Air

The incinerator operates under negative pressure. Combustion air is distributed to the burner located in the front wall of the rotary kiln and to the two burners in the afterburner chamber. Air is pulled into the combustion air fan from the atmosphere and from pick-up points from the bulk solids building. Some combustion air is introduced at the kiln back wall through air in-leakage around the seals. An induced draft fan is used to draw combustion gases through the unit and to maintain a negative pressure on the incineration system. The induced

draft fan is located after the WESP and discharges to the stack. The induced draft fan has a variable speed 400 HP motor and a Hastelloy wheel. The amount of air that flows through the incinerator depends upon the speed of the induced draft fan and system pressure drop.

2.3 Gas Conditioning and Air Pollution Control

The hot combustion gases exiting the afterburner chamber are treated by the gas conditioning and air pollution control train to remove entrained particulate matter and acid gases.

2.3.1 Spray Dryer

The spray dryer serves to cool the hot gases by evaporation to a level acceptable to admit them to the baghouse for filtration. Additionally, the brine solution resulting from the various absorbing, scrubbing, and neutralizing steps is spray dried thus eliminating the need for process liquid blowdown. Some of the dried solids from the brine are collected to the screw bottom and discharged for off-site disposal. Most of the dried solids continue on with the combustion gases to the baghouse. Material of construction is carbon steel and the vessel is refractory lined.

2.3.2 Baghouse

Cooled gases from the spray dryer contain particulate from the combustion and spray drying processes. The baghouse removes most of the particulate by filtration before discharging the gases to the saturator. The fiberglass bags have an area of 42,240 ft^2 and are located in multiple compartments. The compartments are fitted with compressed air bag pulse cleaning systems. The collected solids are mechanically conveyed for off-site disposal at a hazardous waste landfill. Material of construction is carbon steel.

2.3.3 Saturator

The moderately warm gases from the baghouse are cooled to saturation temperature in the saturator. This step is performed to protect downstream equipment and prepare the gases for scrubbing.

2.3.4 Wet Scrubber

Saturated gases exiting from the saturator are admitted to a two-stage packed bed wet absorbing/scrubbing process. This process reduces the levels of sulfur dioxide and hydrogen chloride in the gases. The scrubbers are physically arranged for counter flow of gases and liquids. The scrubbing liquor for each scrubbing stage is separately circulated, cooled, and neutralized. The second

stage neutralization circuit has a blow down to the first stage. The first stage neutralization circuit has a blow down to the spray dryer.

2.3.5 Wet Electrostatic Precipitator (WESP)

The WESP was originally installed because of concerns it would be needed to ensure removal of acid gas aerosols and micro-particulate in the gases. Operating experience and testing results indicate that the WESP provides minimal control of acid gas aerosols and micro-particulate and it is no longer operated.

2.3.6 Stack

Gases are drawn through the air pollution control train by an induced draft fan. The induced draft fan propels the gases to the stack for atmospheric discharge. The stack is constructed of fiberglass reinforced plastic, is secured by guy wires, and discharges 149 feet above grade.

3. Location and Description of Temperature, Pressure, and Flow Indication Controlling Devices

The facility's RCRA Permit gives details of the location of instruments in the incineration system. Stack gases are monitored for CO, CO_2, O_2, NO_X, SO_2, and THC using continuous analyzers.

4. Feed Mechanisms

The Aragonite incineration facility has different feed mechanisms, allowing for maximum flexibility in the handling and incineration of wastes. These wastes and their feed mechanisms are:

- Containerized waste – fed to the rotary kiln by use of a ram feed mechanism. Some containerized waste liquid is also pumped from the container directly to the rotary kiln.

- Bulk solids – fed to the rotary kiln by use of an apron feeder.

- Sludge materials – fed to the rotary kiln from storage tanks or directly from direct burn vessels or over the road tankers.

- Direct burn liquid waste (energetic) – fed to the rotary kiln from direct burn vessels and over the road tankers. The material from this system will feed a direct burn port in the front wall of the rotary kiln.

- Aqueous liquid waste – fed to the rotary kiln and ABC from storage tanks.

- Liquid blend waste – fed to the rotary kiln and ABC from storage tanks, and
- Materials from compressed gas cylinders – fed to the ABC from a cylinder emptying station.

Used oil is used as auxiliary fuel to the incinerator. Used oil can be fed to both the rotary kiln and ABC from the fuel storage tank. Auxiliary fuel is typically used during startup and shutdown of the incinerator and may be used during waste operations as needed.

5. Waste Stream Characterization

RCRA characteristic and listed wastes, TSCA wastes, i.e. PCBs-containing wastes, and RCRA/TSCA comingled wastes are treated in the Aragonite incinerator. The facility is designed to handle all waste phases including liquids, solids, and sludges. RCRA characteristic wastes and listed wastes are treated with the exception of those excluded by the permit, i.e. water reactive wastes (except in approved labpacks); pyrophoric wastes; DOT forbidden explosives; shock sensitive wastes; radioactive wastes; and the dioxin-containing wastes (RCRA waste codes F020, F021, F022, F023, F026, F027, and F028).

Additional information for the targeted compositions of waste materials to be fed to the incinerator during the 2007 Test Burn can be found in Table 1-4 of this document.

6. Process Stream Descriptions

The incineration process generates several process streams. The rotary kiln is operated in the slagging mode during normal operations. The slag exits the incinerator and is cooled in a wet deslagger. The cooled material is then discharged into roll-off boxes for off-site disposal.

The combustion gases exiting the ABC enter a spray dryer. Scrubber blow down, which has been neutralized with soda ash, is added to the combustion gases in the spray dryer to cool the gases. Some of the dried solids fall to the bottom of the spray dryer and are transferred into roll-off boxes for off-site disposal. Most of the dried solids continue on with the combustion gases to the baghouse.

Leaving the spray dryer, the combustion gases enter the baghouse. Remaining solids in the gas stream are removed in the baghouse. Baghouse solids, from the periodic cleaning of the bags, are placed into roll-off boxes for off-site disposal. The combustion gases pass through a saturator that cools them to 175 °F and then through a scrubber where some of the combustion products are absorbed by the circulating brine. The scrubbed gases pass through a WESP and then

exit the stack. The circulating brine from the scrubbers is blown down to the spray dryer.

Appendix B

Analytical MDLs and RLs, Analyte Lists

Compound (VOST Tube)	RL	Units	MDL	Units
Benzene	0.025	ug	0.0043	ug
Bromodichloromethane	0.025	ug	0.0044	ug
Bromoform	0.025	ug	0.0065	ug
Bromomethane	0.05	ug	0.0078	ug
Carbon tetrachloride	0.025	ug	0.0034	ug
Chlorobenzene	0.025	ug	0.0043	ug
Dibromochloromethane	0.025	ug	0.0038	ug
Chloroethane	0.05	ug	0.0039	ug
Chloroform	0.025	ug	0.0046	ug
1,1-Dichloroethane	0.025	ug	0.0034	ug
1,2-Dichloroethane	0.025	ug	0.0048	ug
1,1-Dichloroethene	0.025	ug	0.0057	ug
1,2-Dichloroethene (total)	0.025	ug	0.0085	ug
1,2-Dichloropropane	0.025	ug	0.0045	ug
cis-1,3-Dichloropropene	0.025	ug	0.0039	ug
trans-1,3-Dichloropropene	0.025	ug	0.0039	ug
Ethylbenzene	0.025	ug	0.0032	ug
Methylene chloride	0.025	ug	0.012	ug
Styrene	0.025	ug	0.0049	ug
1,1,2,2-Tetrachloroethane	0.025	ug	0.0067	ug
Tetrachloroethene	0.025	ug	0.0044	ug
Toluene	0.025	ug	0.0027	ug
1,1,1-Trichloroethane	0.025	ug	0.0051	ug
1,1,2-Trichloroethane	0.025	ug	0.0056	ug
Trichloroethene	0.025	ug	0.0099	ug
Vinyl chloride	0.025	ug	0.0032	ug
Xylenes (total)	0.075	ug	0.012	ug

Compound (VOST Condensate)	RL	Units	MDL	Units
Benzene	1	ug/L	0.1	ug/L
Bromodichloromethane	1	ug/L	0.1	ug/L
Bromoform	1	ug/L	0.14	ug/L
Bromomethane	2	ug/L	0.38	ug/L
Carbon tetrachloride	1	ug/L	0.12	ug/L
Chlorobenzene	1	ug/L	0.1	ug/L
Dibromochloromethane	1	ug/L	0.2	ug/L
Chloroethane	2	ug/L	0.24	ug/L
Chloroform	1	ug/L	0.1	ug/L
1,1-Dichloroethane	1	ug/L	0.1	ug/L
1,2-Dichloroethane	1	ug/L	0.1	ug/L
1,1-Dichloroethene	1	ug/L	0.1	ug/L
1,2-Dichloroethene (total)	1	ug/L	0.2	ug/L
1,2-Dichloropropane	1	ug/L	0.1	ug/L
cis-1,3-Dichloropropene	1	ug/L	0.21	ug/L
trans-1,3-Dichloropropene	1	ug/L	0.11	ug/L
Ethylbenzene	1	ug/L	0.1	ug/L
Methylene chloride	2	ug/L	0.23	ug/L
Styrene	1	ug/L	0.1	ug/L
1,1,2,2-Tetrachloroethane	1	ug/L	0.15	ug/L
Tetrachloroethene	1	ug/L	0.1	ug/L
Toluene	1	ug/L	0.1	ug/L
1,1,1-Trichloroethane	1	ug/L	0.1	ug/L
1,1,2-Trichloroethane	1	ug/L	0.25	ug/L
Trichloroethene	1	ug/L	0.1	ug/L
Vinyl chloride	1	ug/L	0.24	ug/L
Xylenes (total)	1	ug/L	0.3	ug/L

Air Pollution Testing

Client Sample ID: OUT RUN 1 TUBE 1 BLANK

GC/MS Volatiles

Lot-Sample #...: H3J210291-009 **Work Order #...:** F234J1AA **Matrix.....:** AIR
Date Sampled...: 10/14/03 **Date Received..:** 10/21/03
Prep Date.....: 10/22/03 **Analysis Date..:** 10/22/03
Prep Batch #...: 3295126
Dilution Factor: 1 **Method.....:** SW846 VOST

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Bromochloromethane	ND	0.025	ug	0.0056
Bromodichloromethane	ND	0.025	ug	0.0042
Carbon tetrachloride	ND	0.025	ug	0.0069
Chlorobenzene	ND	0.025	ug	0.0032
Chlorodibromomethane	ND	0.025	ug	0.0056
Chloroethane	ND	0.050	ug	0.0068
Chloroform	ND	0.025	ug	0.0070
Chloromethane	ND	0.050	ug	0.0048
1,2-Dibromo-3-chloro-propane	ND	0.050	ug	0.011
1,2-Dichlorobenzene	ND	0.025	ug	0.0077
1,3-Dichlorobenzene	ND	0.025	ug	0.0038
1,4-Dichlorobenzene	ND	0.025	ug	0.0055
cis-1,4-Dichloro-2-butene	ND	0.025	ug	0.0025
trans-1,4-Dichloro-2-butene	ND	0.025	ug	0.0040
Dichlorodifluoromethane	ND	0.025	ug	0.0051
1,1-Dichloroethane	ND	0.025	ug	0.0064
1,2-Dichloroethane	ND	0.025	ug	0.0066
trans-1,2-Dichloroethene	ND	0.025	ug	0.0074
1,1-Dichloroethene	ND	0.025	ug	0.0067
1,2-Dichloropropane	ND	0.025	ug	0.0049
cis-1,3-Dichloropropene	ND	0.025	ug	0.0046
trans-1,3-Dichloropropene	ND	0.025	ug	0.0059
Hexachlorobutadiene	ND	0.025	ug	0.012
Methylene chloride	ND	0.025	ug	0.016
1,1,1,2-Tetrachloroethane	ND	0.025	ug	0.0037
1,1,2,2-Tetrachloroethane	ND	0.025	ug	0.0097
Tetrachloroethene	ND	0.025	ug	0.0062
1,2,4-Trichloro-benzene	ND	0.025	ug	0.013
1,1,1-Trichloroethane	ND	0.025	ug	0.0082
1,1,2-Trichloroethane	ND	0.025	ug	0.0070
Trichloroethene	ND	0.025	ug	0.0065
Trichlorofluoromethane	ND	0.050	ug	0.0068
1,2,3-Trichloropropane	ND	0.025	ug	0.010
Vinyl chloride	ND	0.025	ug	0.0025

(Continued on next page)

Reporting Limits for PCBs by M-1668
(Totals per chlorination level)

Analyte	Reporting Limit (ng/sample)
Total Mono-PCBs	2ng/sample
Total Di-PCBs	2ng/sample
Total Tri-PCBs	2ng/sample
Total Tetra-PCBs	2ng/sample
Total Penta-PCBs	2ng/sample
Total Hexa-PCBs	2ng/sample
Total Hepta-PCBs	2ng/sample
Total Octa-PCBs	2ng/sample
Total Nona-PCBs	2ng/sample
Total Deca-PCBs	2ng/sample

The reporting limits are based on a 4-way split of the air train extract, using one-quarter for analysis.

The reporting limit threshold of 2ng/sample will be used for the reporting of PCB totals per chlorination level.

Multiple Metals Reporting Limits
M-29 List

Element	ICPMS-FH or BH separate (150ml) (µg)	ICPMS-FH & BH combined (300ml) (µg)
Sb	0.3	0.6
As	0.3	0.6
Ba	0.15	0.3
Be	0.15	0.3
Cd	0.15	0.3
Cr	0.3	0.6
Co	0.15	0.3
Cu	0.3	0.6
Pb	0.15	0.3
Mn	0.15	0.3
Ni	0.3	0.6
P	7.5	15
Se	0.3	0.6
Ag	0.15	0.3
Tl	0.15	0.3
Zn	0.75	1.5

All reporting limits are approximate. The FH or BH separate reporting limits are based on a final volume of 150 mls for the front half digestate and 150 mls for the back half digestate. The reporting limits for the FH & BH combined are based on a proportional combination of the 150ml FH digestate and the 150 ml BH digestate for a total volume of 300 mls. Actual limits will vary based on the volume of the nitric/peroxide impinger received, and the amount removed for mercury analysis.

Method 0023A/8290 Target Detection Limits

Component	Target Detection Limit TDL = ½ LCL
	pg/sample
2,3,7,8-TCDD	20
Total TCDD	20
1,2,3,7,8-PeCDD	100
Total PeCDD	100
1,2,3,4,7,8-HxCDD	100
1,2,3,6,7,8-HxCDD	100
1,2,3,7,8,9-HxCDD	100
Total HxCDD	100
1,2,3,4,6,7,8-HpCDD	100
Total HpCDD	100
OCDD	200
2,3,7,8-TCDF	20
Total TCDF	20
1,2,3,7,8-PeCDF	100
2,3,4,7,8-PeCDF	100
Total PeCDF	100
1,2,3,4,7,8-HxCDF	100
1,2,3,6,7,8-HxCDF	100
2,3,4,6,7,8-HxCDF	100
1,2,3,7,8,9-HxCDF	100
Total HxCDF	100
1,2,3,4,6,7,8-HpCDF	100
1,2,3,4,7,8,9-HpCDF	100
Total HpCDF	100
OCDF	200

DLs based on 4- way split of extract using one-quarter each for dioxin, PCB, and SVOC analysis and one-quarter for archive.

STL Reference Data Summary

Structured Analysis Code: S-DB-FX-3V-07

Target Analyte List: SAC: 8270C (SIM) Hexachloroethane

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: 8270C (SIM)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Target List 20828			Detection Limits				Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1497	Hexachloroethane	0.1	ug	0.045	ug	19981028	C	Y	100	ug	38	96	20	C	Y	100	ug	38	96	20
1425	2-Fluorobiphenyl						X	Y	50	ug	49	107	0	X	Y	50	ug	49	107	0
1426	2-Fluorophenol						X	Y	100	ug	18	104	0	X	Y	100	ug	18	104	0
2512	2,4,6-Tribromophenol						X	Y	100	ug	31	130	0	X	Y	100	ug	31	130	0
2736	Nitrobenzene-d5						X	Y	50	ug	38	103	0	X	Y	50	ug	38	103	0
2737	Phenol-d5						X	Y	100	ug	20	113	0	X	Y	100	ug	20	113	0
2738	Terphenyl-d14						X	Y	50	ug	54	138	0	X	Y	50	ug	54	138	0
2854	2-Chlorophenol-d4						X	N	100	ug	20	130	0	X	N	100	ug	20	130	0
2855	1,2-Dichlorobenzene-d4						X	Y	50	ug	21	112	0	X	Y	50	ug	21	112	0
4191	Benzo(a)pyrene-d12						X	N	100	ug	40	150	0	X	N	100	ug	40	150	0
4197	Fluoranthene-d10						X	N	100	ug	40	150	0	X	N	100	ug	40	150	0

STL Reference Data Summary

Structured Analysis Code: S-DB-QL-3V-07

Target Analyte List: SAC: 8270C Air Emissions List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

	Target List 20807		Detection Limits				Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1	Acenaphthene	10	ug	5.0	ug	19981028	C	Y	100	ug	58	105	20	C	Y	100	ug	58	105	20
5	Acenaphthylene	10	ug	5.0	ug	19981028	C	Y	100	ug	53	112	23	C	Y	100	ug	53	112	23
122	Anthracene	10	ug	5.0	ug	19981028	C	Y	100	ug	63	110	20	C	Y	100	ug	63	110	20
3608	Benz(a)anthracene	10	ug	5.0	ug	19981028	C	Y	100	ug	68	112	20	C	Y	100	ug	68	112	20
205	Benzo(b)fluoranthene	10	ug	6.22	ug	19981028	C	Y	100	ug	59	131	15	C	Y	100	ug	59	131	15
208	Benzo(k)fluoranthene	10	ug	5.37	ug	19981028	C	Y	100	ug	49	132	31	C	Y	100	ug	49	132	31
209	Benzoic acid	50	ug	14.03	ug	19981028		Y	100	ug	10	154	25		Y	100	ug	10	154	25
210	Benzo(ghi)perylene	10	ug	2.43	ug	19981028	C	Y	100	ug	43	119	25	C	Y	100	ug	43	119	25
211	Benzo(a)pyrene	10	ug	5.0	ug	19981028	C	Y	100	ug	61	116	20	C	Y	100	ug	61	116	20
213	Benzo(e)pyrene	10	ug	5	ug	19981028														
215	Benzyl alcohol	10	ug	1.66	ug	19981028	C	Y	100	ug	25	130	20	C	Y	100	ug	25	130	20
289	bis(2-Chloroethoxy)methane	10	ug	1.76	ug	19981028	C	Y	100	ug	57	97	28	C	Y	100	ug	57	97	28
293	bis(2-Chloroethyl) ether	10	ug	1.57	ug	19981028	C	Y	100	ug	47	113	20	C	Y	100	ug	47	113	20
298	bis(2-Chloroisopropyl) ether	10	ug	1.61	ug	19981028														
302	bis(2-Ethylhexyl) phthalate	10	ug	1.84	ug	19981028	C	Y	100	ug	65	122	20	C	Y	100	ug	65	122	20
348	4-Bromophenyl phenyl ether	10	ug	1.73	ug	19981028	C	Y	100	ug	62	113	20	C	Y	100	ug	62	113	20
403	Butyl benzyl phthalate	10	ug	5.0	ug	19981028	C	Y	100	ug	61	122	20	C	Y	100	ug	61	122	20
518	4-Chloroaniline	10	ug	5	ug	19981028		Y	100	ug	10	90	65		Y	100	ug	10	90	65
578	4-Chloro-3-methylphenol	50	ug	10	ug	19981028	C	Y	100	ug	63	103	29	C	Y	100	ug	63	103	29
589	2-Chloronaphthalene	10	ug	1.11	ug	19981028	C	Y	100	ug	57	97	26	C	Y	100	ug	57	97	26
600	2-Chlorophenol	10	ug	3.25	ug	19981028	C	Y	100	ug	53	97	23	C	Y	100	ug	53	97	23
602	4-Chlorophenyl phenyl ether	10	ug	5.0	ug	19981028	C	Y	100	ug	56	115	20	C	Y	100	ug	56	115	20
633	Chrysene	10	ug	5.0	ug	19981028	C	Y	100	ug	65	112	20	C	Y	100	ug	65	112	20
860	Dibenz(a,h)anthracene	10	ug	2.29	ug	19981028	C	Y	100	ug	44	125	20	C	Y	100	ug	44	125	20
863	Dibenzofuran	10	ug	5.0	ug	19981028	C	Y	100	ug	61	101	20	C	Y	100	ug	61	101	20
891	Di-n-butyl phthalate	10	ug	2.74	ug	19981028	C	Y	100	ug	63	113	20	C	Y	100	ug	63	113	20
904	1,2-Dichlorobenzene	10	ug	2.05	ug	19981028	C	Y	100	ug	46	94	25	C	Y	100	ug	46	94	25
907	1,3-Dichlorobenzene	10	ug	2.03	ug	19981028	C	Y	100	ug	46	93	22	C	Y	100	ug	46	93	22
910	1,4-Dichlorobenzene	10	ug	2.00	ug	19981028	C	Y	100	ug	47	92	22	C	Y	100	ug	47	92	22
918	3,3'-Dichlorobenzidine	10	ug	5	ug	19981028														
971	2,4-Dichlorophenol	10	ug	2.98	ug	19981028	C	Y	100	ug	56	96	20	C	Y	100	ug	56	96	20
1082	Diethyl phthalate	10	ug	5.0	ug	19981028	C	Y	100	ug	60	113	20	C	Y	100	ug	60	113	20
1145	2,4-Dimethylphenol	10	ug	10	ug	19981028	C	Y	100	ug	13	85	200	C	Y	100	ug	13	85	200
1149	Dimethyl phthalate	10	ug	5.0	ug	19981028	C	Y	100	ug	45	120	20	C	Y	100	ug	45	120	20
1167	4,6-Dinitro-2-methylphenol	50	ug	22.29	ug	19981028	C	Y	100	ug	38	127	68	C	Y	100	ug	38	127	68
1187	2,4-Dinitrophenol	50	ug	10	ug	19981028	C	Y	100	ug	14	125	166	C	Y	100	ug	14	125	166

Structured Analysis Code: S-DB-QL-3V-07

Target Analyte List: SAC: 8270C Air Emissions List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Target List 20807		Detection Limits					Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1191	2,4-Dinitrotoluene	10	ug	5.0	ug	19981028	C	Y	100	ug	64	109	20	C	Y	100	ug	64	109	20
1193	2,6-Dinitrotoluene	10	ug	1.01	ug	19981028	C	Y	100	ug	63	109	21	C	Y	100	ug	63	109	21
1162	Di-n-octyl phthalate	10	ug	3.98	ug	19981028	C	Y	100	ug	57	134	29	C	Y	100	ug	57	134	29
1414	Fluoranthene	10	ug	1.45	ug	19981028	C	Y	100	ug	65	116	26	C	Y	100	ug	65	116	26
1417	Fluorene	10	ug	5.0	ug	19981028	C	Y	100	ug	58	111	20	C	Y	100	ug	58	111	20
1482	Hexachlorobenzene	10	ug	1.49	ug	19981028	C	Y	100	ug	62	115	20	C	Y	100	ug	62	115	20
1489	Hexachlorobutadiene	10	ug	2.40	ug	19981028	C	Y	100	ug	43	96	20	C	Y	100	ug	43	96	20
1492	Hexachlorocyclopentadiene	50	ug	25	ug	19981028	C	Y	100	ug	50	150	25	C	Y	100	ug	50	150	25
1497	Hexachloroethane	10	ug	1.86	ug	19981028	C	Y	100	ug	38	96	20	C	Y	100	ug	38	96	20
1535	Indeno(1,2,3-cd)pyrene	10	ug	2.12	ug	19981028	C	Y	100	ug	46	124	21	C	Y	100	ug	46	124	21
1566	Isophorone	10	ug	1.33	ug	19981028	C	Y	100	ug	57	100	27	C	Y	100	ug	57	100	27
1829	2-Methylnaphthalene	10	ug	1.75	ug	19981028	C	Y	100	ug	55	100	25	C	Y	100	ug	55	100	25
1851	2-Methylphenol	20	ug	6.24	ug	19980519	C	Y	100	ug	52	101	56	C	Y	100	ug	52	101	56
2777	3-Methylphenol & 4-Methylphenol	50	ug	25	ug	19990304														
1932	Naphthalene	10	ug	1.65	ug	19981028	C	Y	100	ug	53	101	20	C	Y	100	ug	53	101	20
1960	2-Nitroaniline	10	ug	1.56	ug	19981028	C	Y	100	ug	63	109	20	C	Y	100	ug	63	109	20
1964	3-Nitroaniline	10	ug	5	ug	19981028		Y	100	ug	42	106	23		Y	100	ug	42	106	23
1968	4-Nitroaniline	50	ug	50	ug	19981028	C	Y	100	ug	41	113	28	C	Y	100	ug	41	113	28
1972	Nitrobenzene	10	ug	1.84	ug	19981028	C	Y	100	ug	55	99	20	C	Y	100	ug	55	99	20
1998	2-Nitrophenol	50	ug	3.43	ug	19981028	C	Y	100	ug	56	96	35	C	Y	100	ug	56	96	35
2001	4-Nitrophenol	50	ug	10	ug	19981028	C	Y	100	ug	14	133	73	C	Y	100	ug	14	133	73
2018	N-Nitrosodimethylamine	10	ug	5.0	ug	19990304	C	Y	100	ug	39	104	32	C	Y	100	ug	39	104	32
2028	N-Nitrosodiphenylamine	10	ug	1.68	ug	19981028	C	Y	100	ug	52	118	20	C	Y	100	ug	52	118	20
2024	N-Nitrosodi-n-propylamine	10	ug	1.19	ug	19981028	C	Y	100	ug	54	102	30	C	Y	100	ug	54	102	30
2118	Pentachlorophenol	50	ug	18.85	ug	19981028	C	Y	100	ug	49	122	125	C	Y	100	ug	49	122	125
2154	Phenanthrene	10	ug	5.0	ug	19981028	C	Y	100	ug	64	112	20	C	Y	100	ug	64	112	20
2155	Phenol	50	ug	10	ug	19981028	C	Y	100	ug	21	119	24	C	Y	100	ug	21	119	24
2252	Pyrene	10	ug	2.31	ug	19981028	C	Y	100	ug	59	124	27	C	Y	100	ug	59	124	27
2515	1,2,4-Trichlorobenzene	10	ug	2.14	ug	19981028	C	Y	100	ug	52	92	20	C	Y	100	ug	52	92	20
2555	2,4,5-Trichlorophenol	10	ug	10	ug	19981028	C	Y	100	ug	62	108	34	C	Y	100	ug	62	108	34
2559	2,4,6-Trichlorophenol	50	ug	10	ug	19981028	C	Y	100	ug	62	102	56	C	Y	100	ug	62	102	56
1425	2-Fluorobiphenyl						X	Y	50	ug	49	107	0	X	Y	50	ug	49	107	0
1426	2-Fluorophenol						X	Y	100	ug	18	104	0	X	Y	100	ug	18	104	0
2512	2,4,6-Tribromophenol						X	Y	100	ug	31	130	0	X	Y	100	ug	31	130	0
2736	Nitrobenzene-d5						X	Y	50	ug	38	103	0	X	Y	50	ug	38	103	0
2737	Phenol-d5						X	Y	100	ug	20	113	0	X	Y	100	ug	20	113	0
2738	Terphenyl-d14						X	Y	50	ug	54	138	0	X	Y	50	ug	54	138	0
2854	2-Chlorophenol-d4						X	N	100	ug	20	130	0	X	N	100	ug	20	130	0
2855	1,2-Dichlorobenzene-d4						X	Y	50	ug	21	112	0	X	Y	50	ug	21	112	0

Structured Analysis Code: S-DB-QL-3V-07

Target Analyte List: SAC: 8270C Air Emissions List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

	Target List 20807	Detection Limits					Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
4191	Benzo(a)pyrene-d12						X	N	100	ug	40	150	0	X	N	100	ug	40	150	0
4197	Fluoranthene-d10						X	N	100	ug	40	150	0	X	N	100	ug	40	150	0

Air Pollution Testing

Client Sample ID: OUTTRM0050C

General Chemistry

Lot-Sample #...: G3J200216-033 **Work Order #...:** F211K **Matrix.....:** AIR
Date Sampled...: 10/13/03 **Date Received..:** 10/17/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hydrochloric acid	ND G	8.9	mg	SW846 9057	11/07/03	3307455
		MDL.....: 4.5				

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

SAMPLE VOLUME = 348 ML.

Air Pollution Testing

Client Sample ID: OUTTBM0050D

General Chemistry

Lot-Sample #...: G3J200216-034 **Work Order #...:** F211N **Matrix.....:** AIR
Date Sampled...: 10/13/03 **Date Received..:** 10/17/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chlorine	ND	0.12	mg	SW846 9057	10/31/03	3302578
	MDL.....: 0.060					

NOTE(S):

RL Reporting Limit

SAMPLE VOLUME = 238 ML.

Appendix C

Field Data Sheets

Air Pollution Testing, Inc. : Isokinetic Sampling Datasheet

APT Job #:	Date:	CO2 (%):	O2 (%):	Schematic of Stack :
Location:	Operator:	Assumed Moisture (%):	Barometric Pressure (mbar):	
Run #	Probe ID:	Ambient Temperature (oF):	Probe Material:	
Meter Box Yd:	Pitot Tube Coefficient:	Probe Length (ft):	Filter Temperature (oF):	
Sample Box ID:	Meter Box ID:	Probe Temperature (oF):	Moisture (grams):	
Meter DH@:	K Factor:	Nozzle Diameter (in):	Start Time:	
Pre-Test Pitot Leak Check:	Post-Test Pitot Leak Check:	Static Pressure (" H2O):	Stop Time:	
Pre-Test Pump Leak Check:	Post-Test Pump Leak Check:	Filter ID:	Method:	

Traverse Point	Sampling Time (minutes)	Vacuum (" Hg)	Velocity Head (" H2O)	Orifice Setting (" H2O)	Stack Temp. (oF)	Meter Volume (ft3) Initial Volume	Probe Temp. (oF)	Filter Temp. (oF)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	XAD Temp. (oF)	KI (ft3/min)	Pv (ft3)
number	total	maximum	average root	average	average	difference	minimum	minimum	average		maximum	maximum		

Stack ID (inches): _____

Upstream Disturbance (inches): _____

Downstream Disturbance (inches): _____

# of points: _____

Moisture Determination

Imp. #	Tare	Final	Gain
1			
2			
3			
4			

Notes :

Reviewers Signature :

Air-Pollution Testing, Inc. : Laboratory Impinger Weight Gain Datasheet		
APT Job # :	Barometric Pressure :	Date :
Facility:	Orsat ID:	Operator :
Stack ID:	Leak Check:	

Run # :	Method :		Sample Box ID :	
Impinger # and Contents	Inital Mass (grams)	Final Mass (grams)	Gain / Loss (grams)	Notes
1				
2				
3				
4				
5				
6				
7				
8				
Total				

Run # :	Method :		Sample Box ID :	
Impinger # and Contents	Inital Mass (grams)	Final Mass (grams)	Gain / Loss (grams)	Notes
1				
2				
3				
4				
5				
6				
7				
8				
Total				

Run # :	Method :		Sample Box ID :	
Impinger # and Contents	Inital Mass (grams)	Final Mass (grams)	Gain / Loss (grams)	Notes
1				
2				
3				
4				
5				
6				
7				
8				
Total				

Air Pollution Testing, Inc. : Constant Rate Sampling Datasheet

APT Job #:	Date:	CO2 (%):	O2 (%):
Location:	Operator:	Ambient Temperature (oF):	Barometric Pressure (mbar):
Run #	Meter Box ID:	Probe Length (ft):	Moisture (grams):
Meter Box Yd:	Meter DH@:	Static Pressure (" H2O):	Start Time:
Pre-Test Pump Leak Check:	Post-Test Pump Leak Check:	Method:	Stop Time:

Stack ID (inches): _____

Upstream Disturbance (inches): _____

Downstream Disturbance (inches): _____

Schematic of Sampling Location :

Sampling Time (minutes)	Vacuum (" Hg)	Sample Flow Rate (lpm)	Orifice Setting (in. H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (liters) Initial Volume	Notes
total	maximum	average		average		maximum	difference	

Reviewer Signature

Chain of Custody/Sample Log

T: (303) 420-5949
F: (303) 420-5920

Air Pollution Tesing Inc.
5530 Marshall Street
Arvada, Colorado 80002

Project Code	
Client	
Facility Name	
Project Manager	

Page____of____

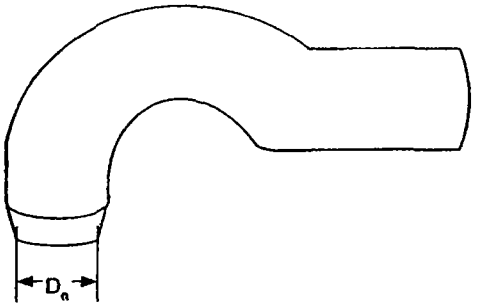
Relinquished By: Date: Time:

Received By: Date: Time:

Sample ID	Run #	Container Type	Date/Time Collected	Matrix	Analysis	Special Instructions	PM Initials

AIR POLLUTION TESTING, INC.

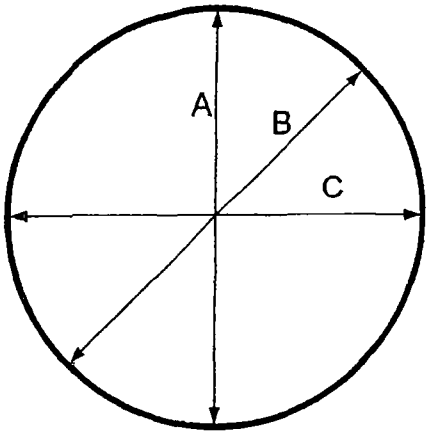
Geometric Nozzle Calibration Form



Nozzle ID: _____

General Condition of Nozzle ? **Good / Bad**

Chips / Cracks ? (if yes, describe) **Yes / No**



Diameter A: _____

Diameter B: _____

Diameter C: _____

Average: _____ **(must be <0.004" / 0.1mm)**

(see 40 CFR Part 60 Appendix A-3, Method 5, Section 10.1)

A P T

PITOT TUBE CALIBRATION – VERIFICATION OF CONSTRUCTION SPECIFICATIONS

Pitot ID:_____ Date:_____

Technician:_____

1. D_t external tubing diameter — D_t = _____ inches

   $0.188" < D_t < 0.375"$ •

2. $\rho = \frac{\rho_A + \rho_B}{2}$ — $\rho_A + \rho_B$ = _____ inches; ρ = _____ inches

3. $Z = (\rho_A + \rho_B) \sin \gamma$ — γ = _____; Z = _____ inches

   $Z < 0.125"$ ••

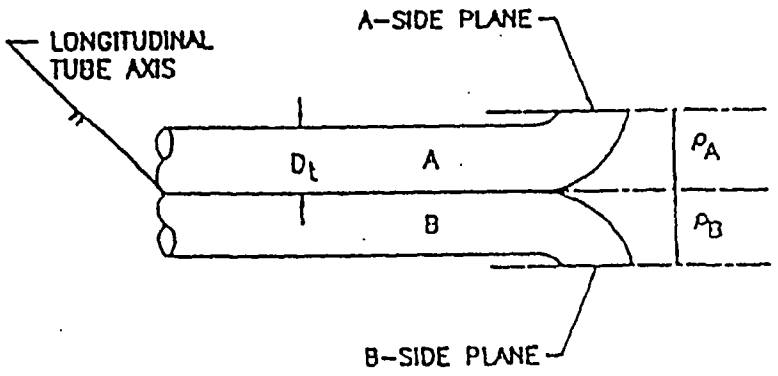
4. $W = (\rho_A + \rho_B) \sin \sigma$ — σ = _____; W = _____ inches

   $W < 0.031"$ ••

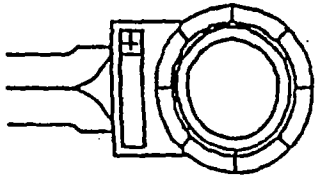
5. $\beta_A, \beta_B < 5°$ •• — β_A = _____; β_B = _____

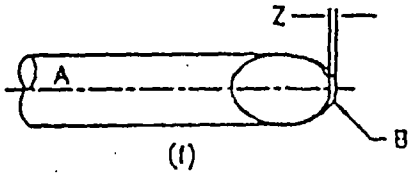
6. $\alpha_A, \alpha_B < 1°$ •• — α_A = _____; α_B = _____

•, •• Acceptable Limits.



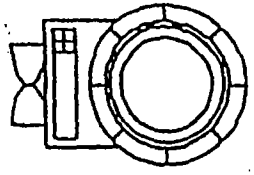
γ:

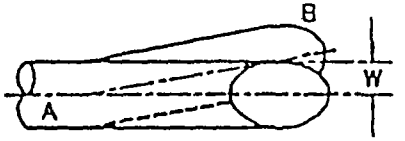




(I)

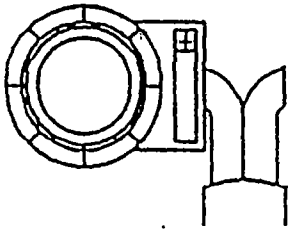
σ :

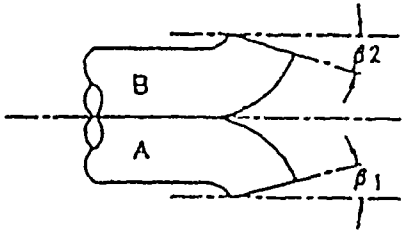




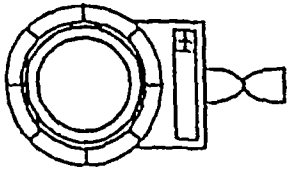
(G)

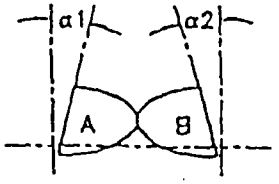
β:





α:



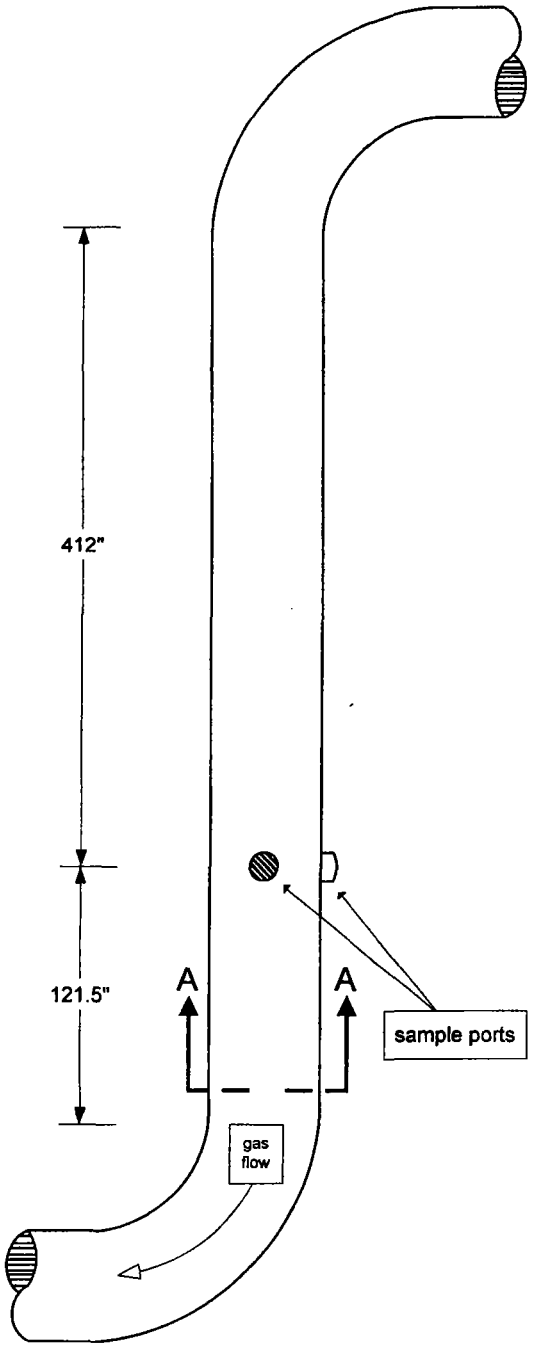


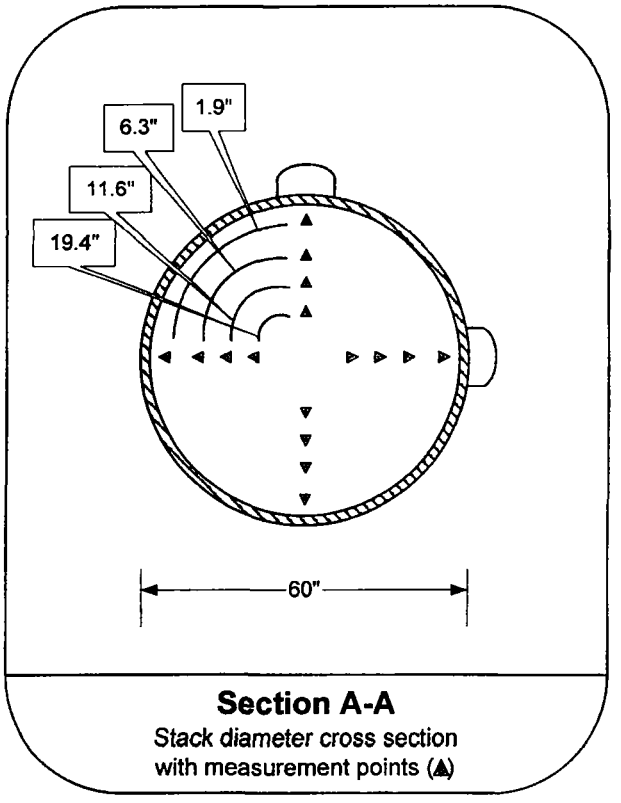
• Standards of Performance for New Stationary Sources, Federal Register, 36 (247), December 23, 1971.

•• Valbra, R.F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Tube Coefficient", U.S. EPA Emission Measurement Branch, Research Triangle Park, N.C., October 1976

Appendix D

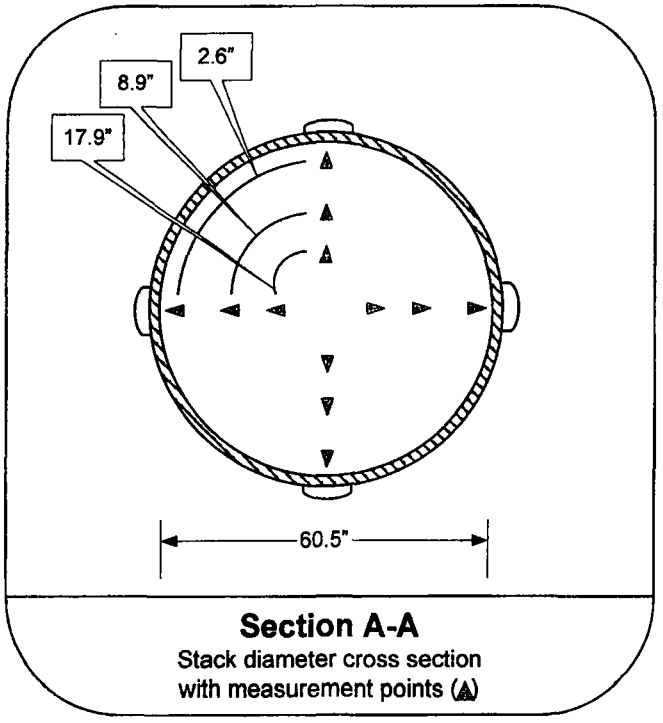
Stack Diagram, Sample Train, and Recovery Schematics



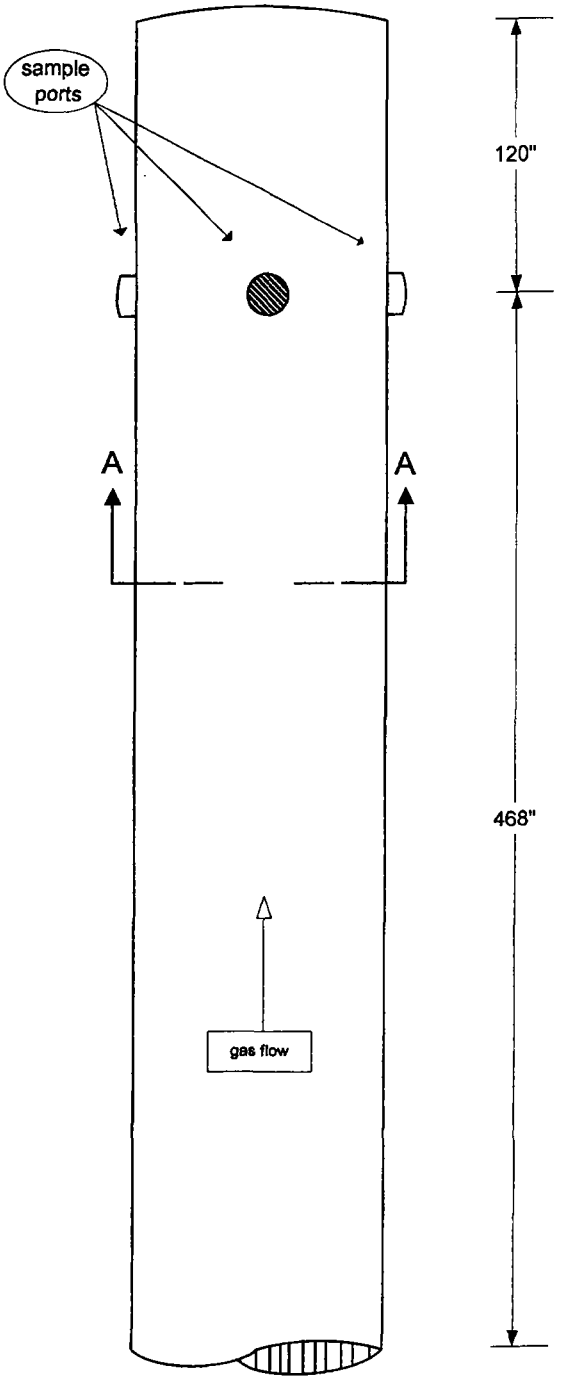


Section A-A
Stack diameter cross section with measurement points (▲)

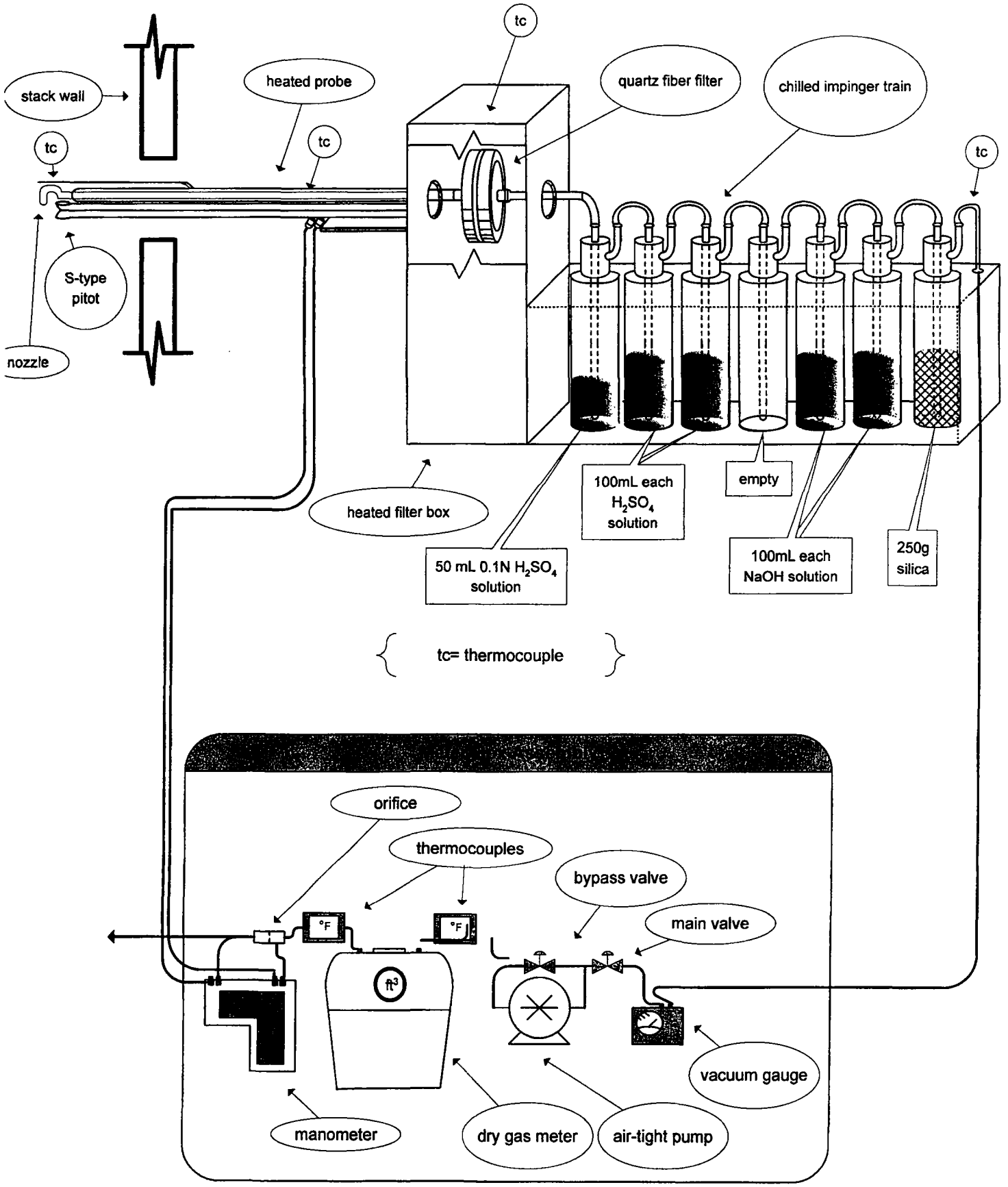
Scrubber Outlet
Sampling Location Schematic
(not to scale)



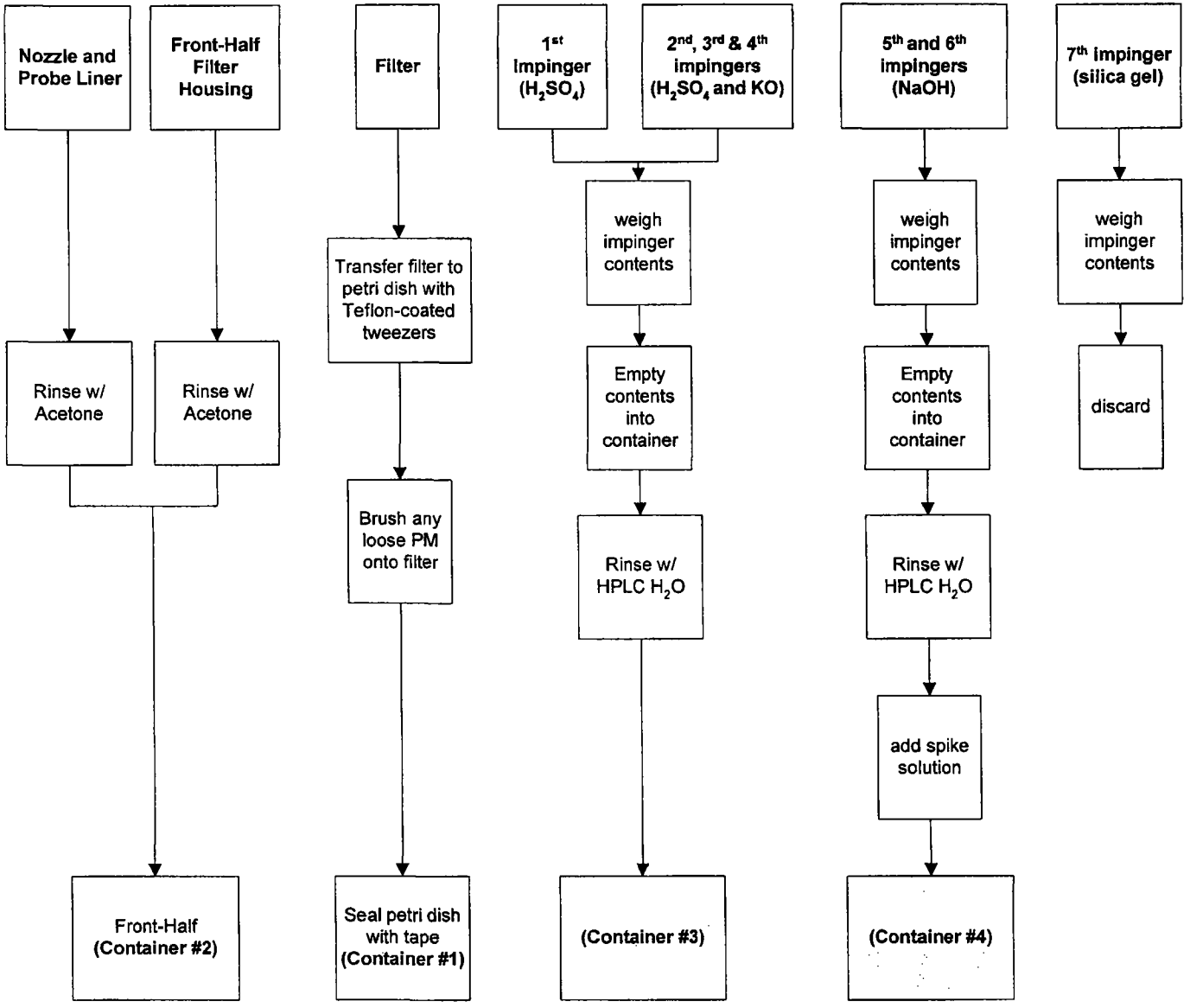
Section A-A
Stack diameter cross section
with measurement points (▲)



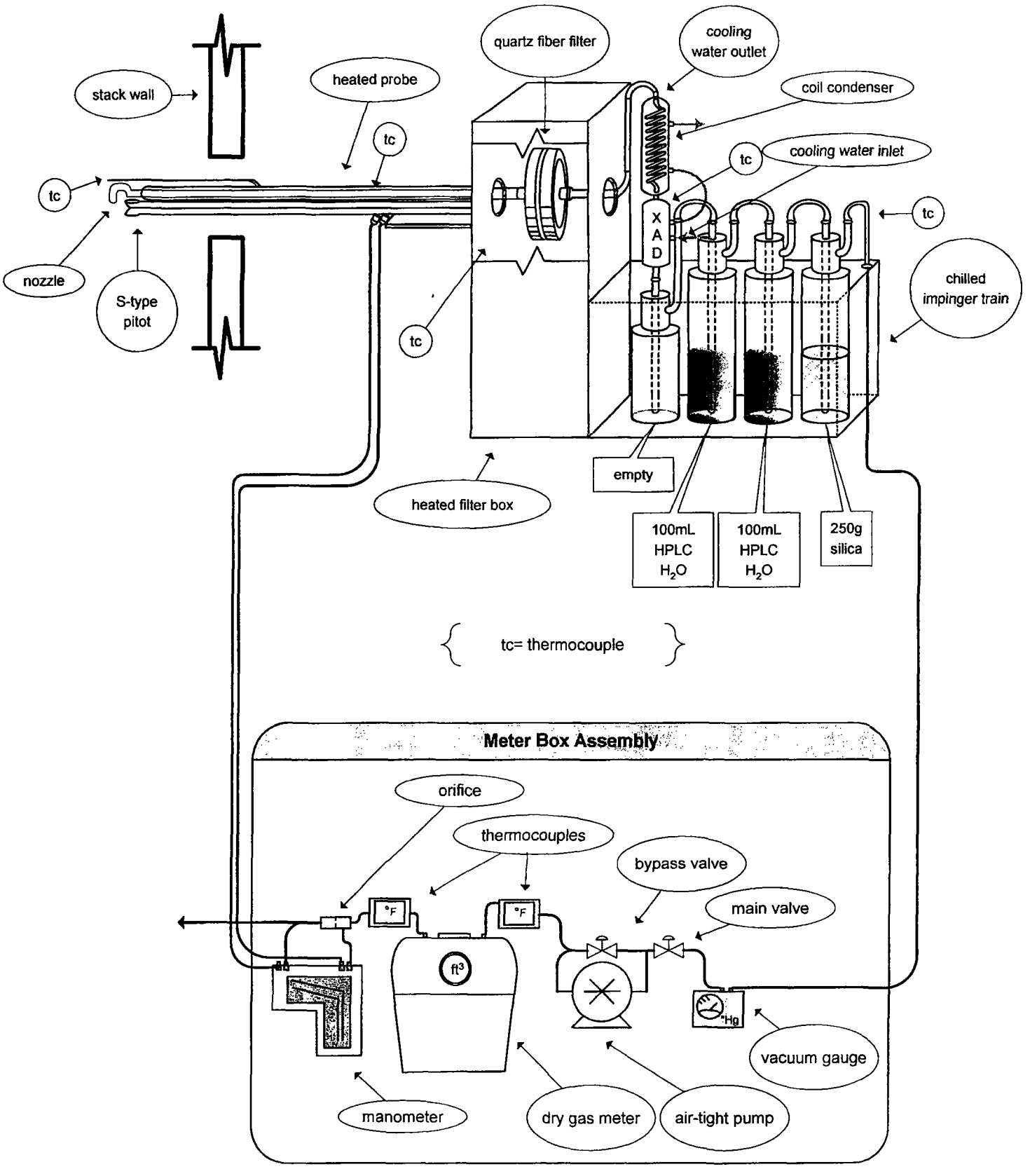
Exhaust Stack
Sampling Location Schematic
(not to scale)



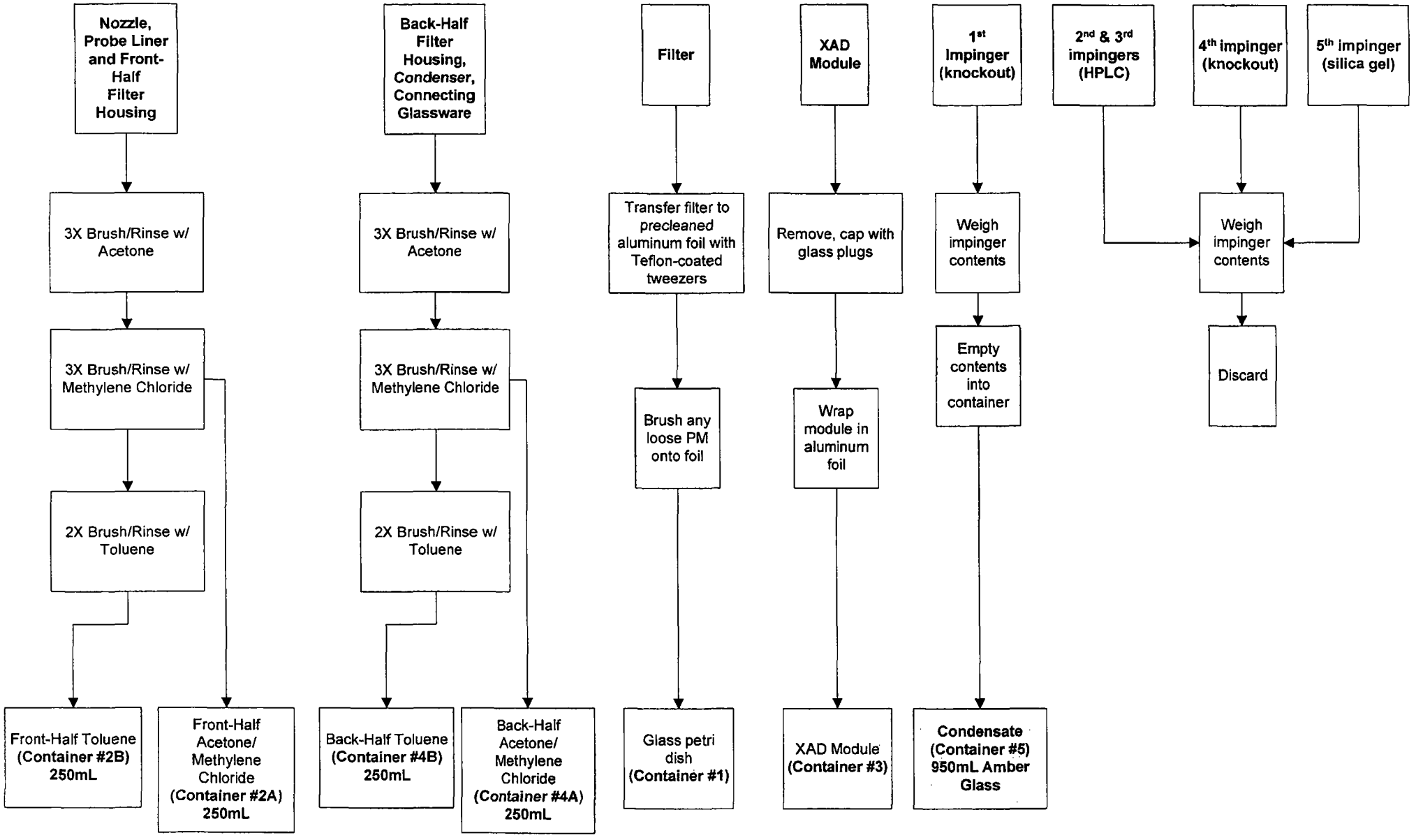
EPA Method 26A
sampling train schematic



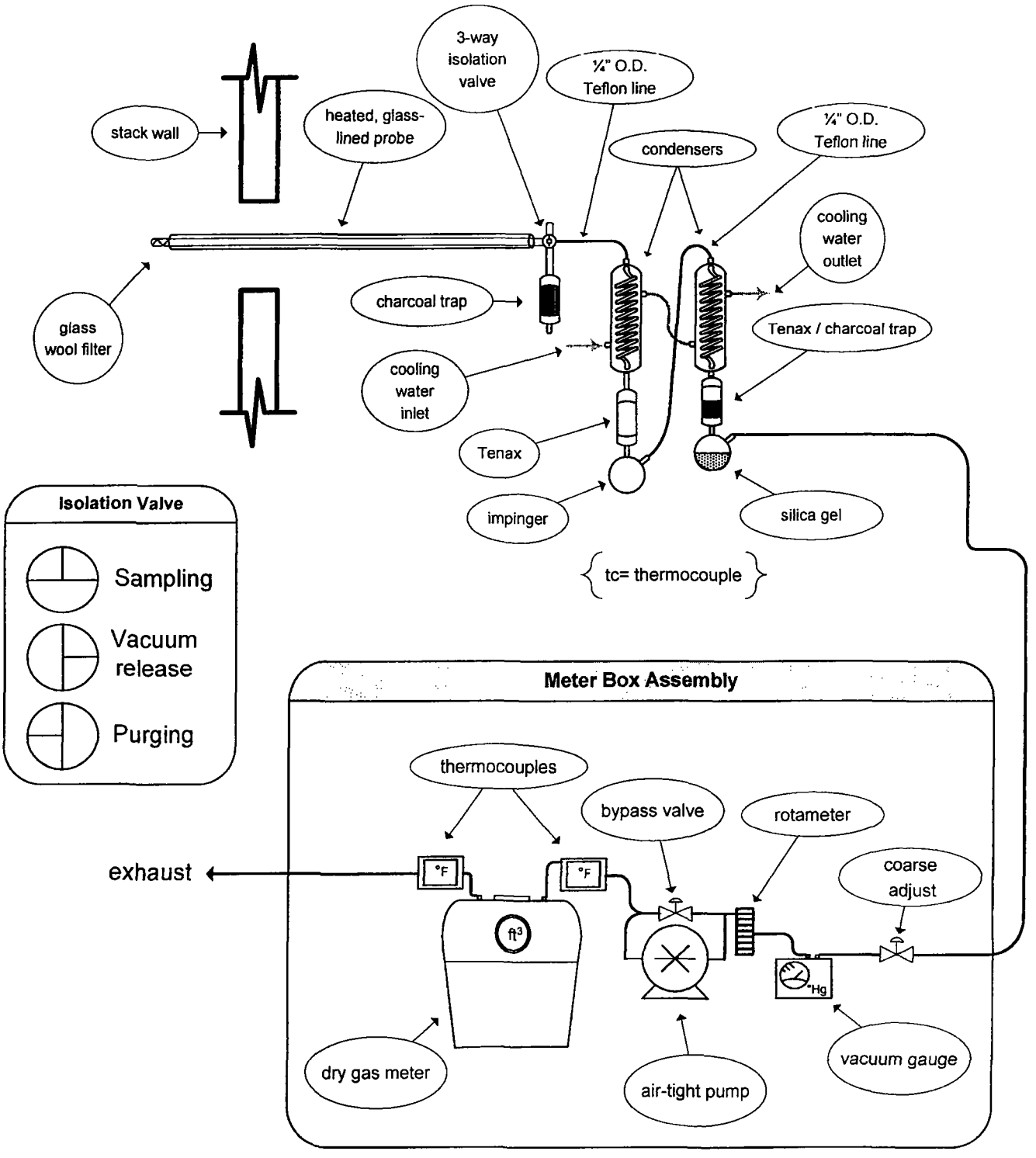
Method 26A Recovery



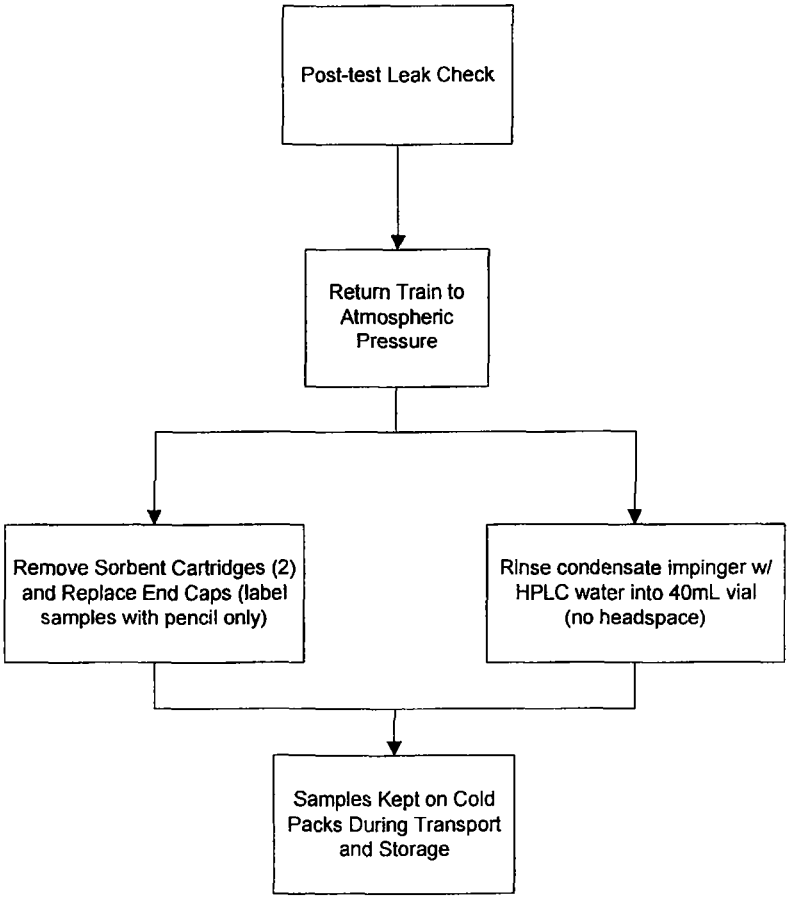
Method 0023A
sampling train schematic



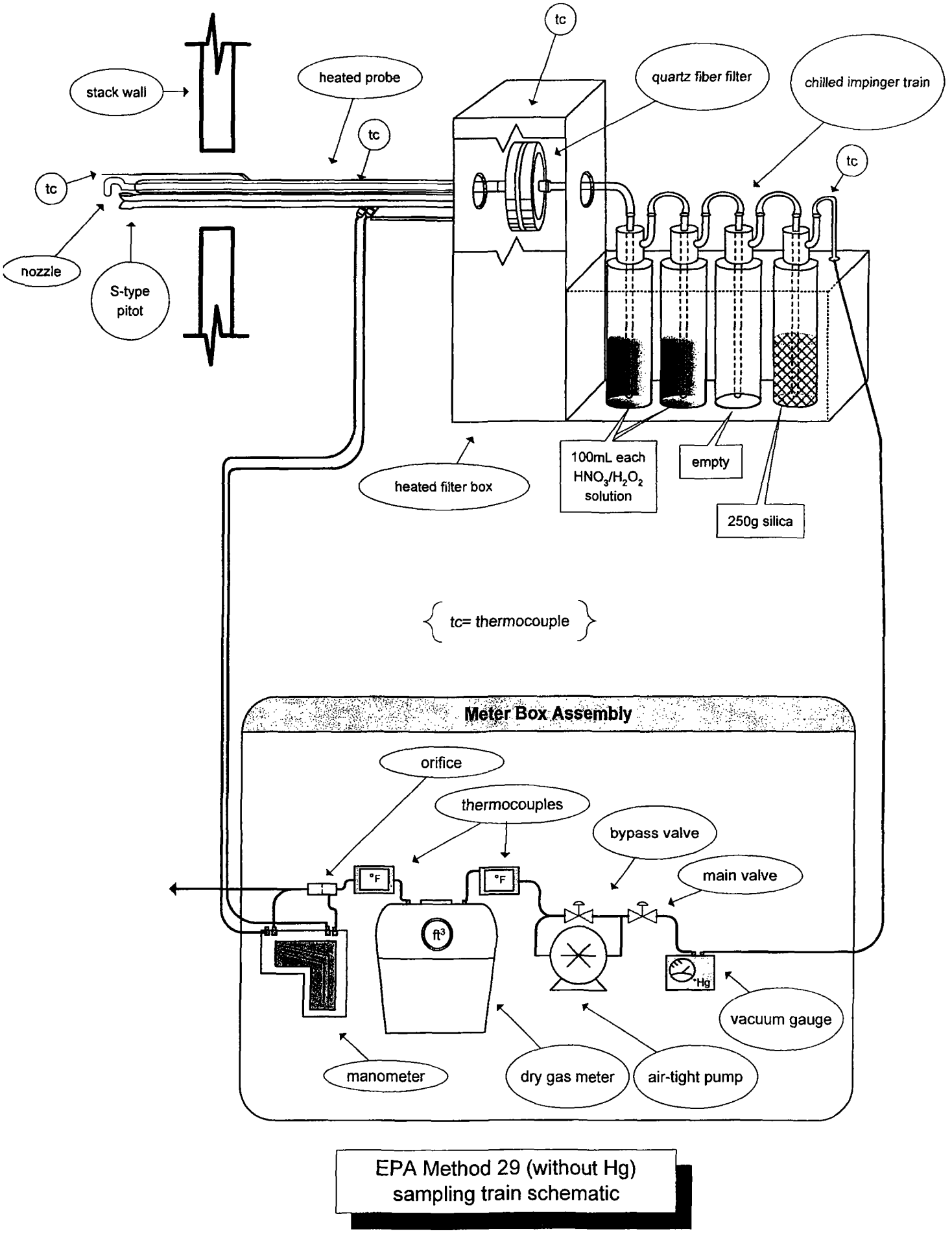
Method 0023A Recovery (modified for Method 0010)



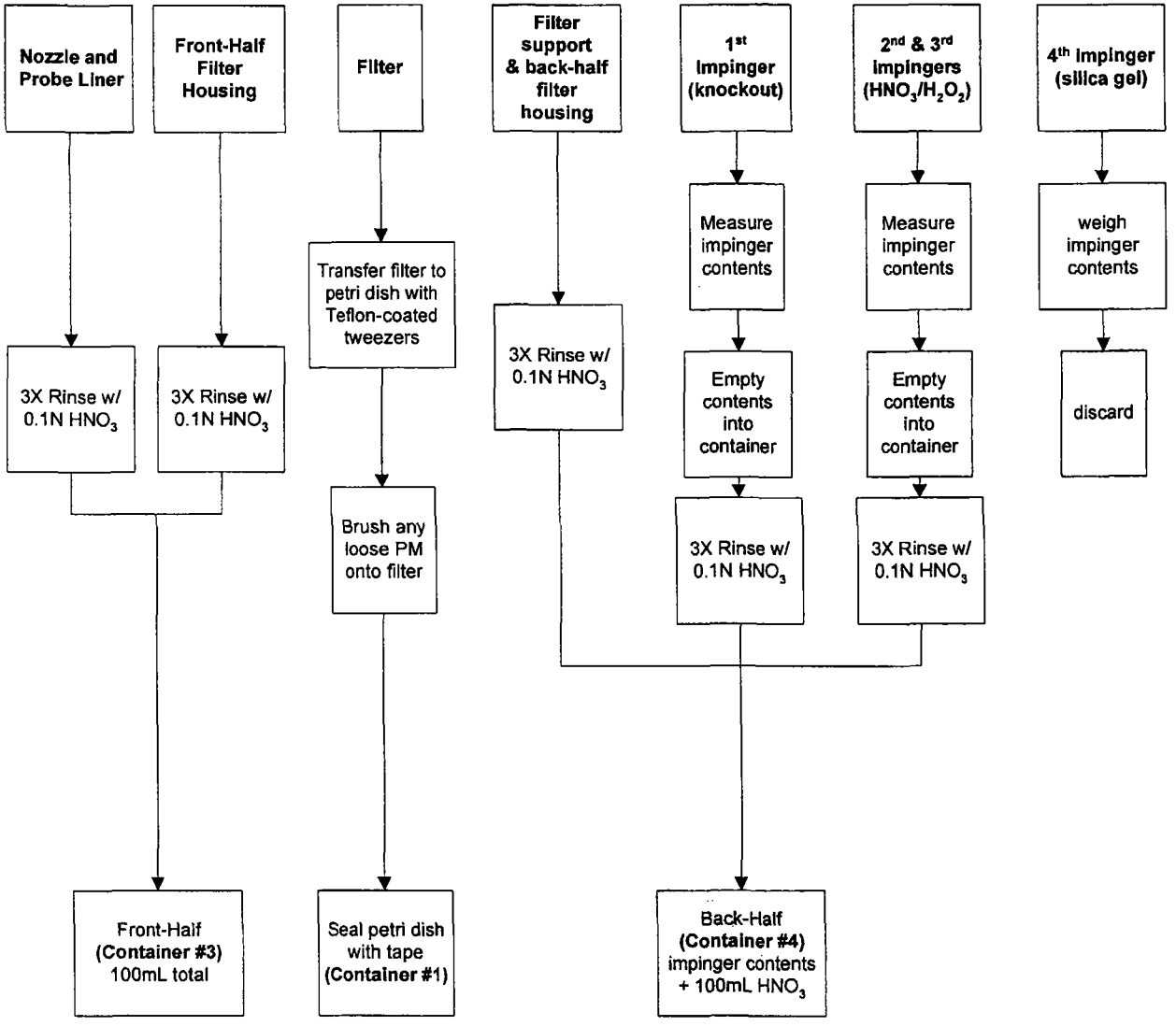
SW-846 Method 0030
(VOST)
sampling train schematic



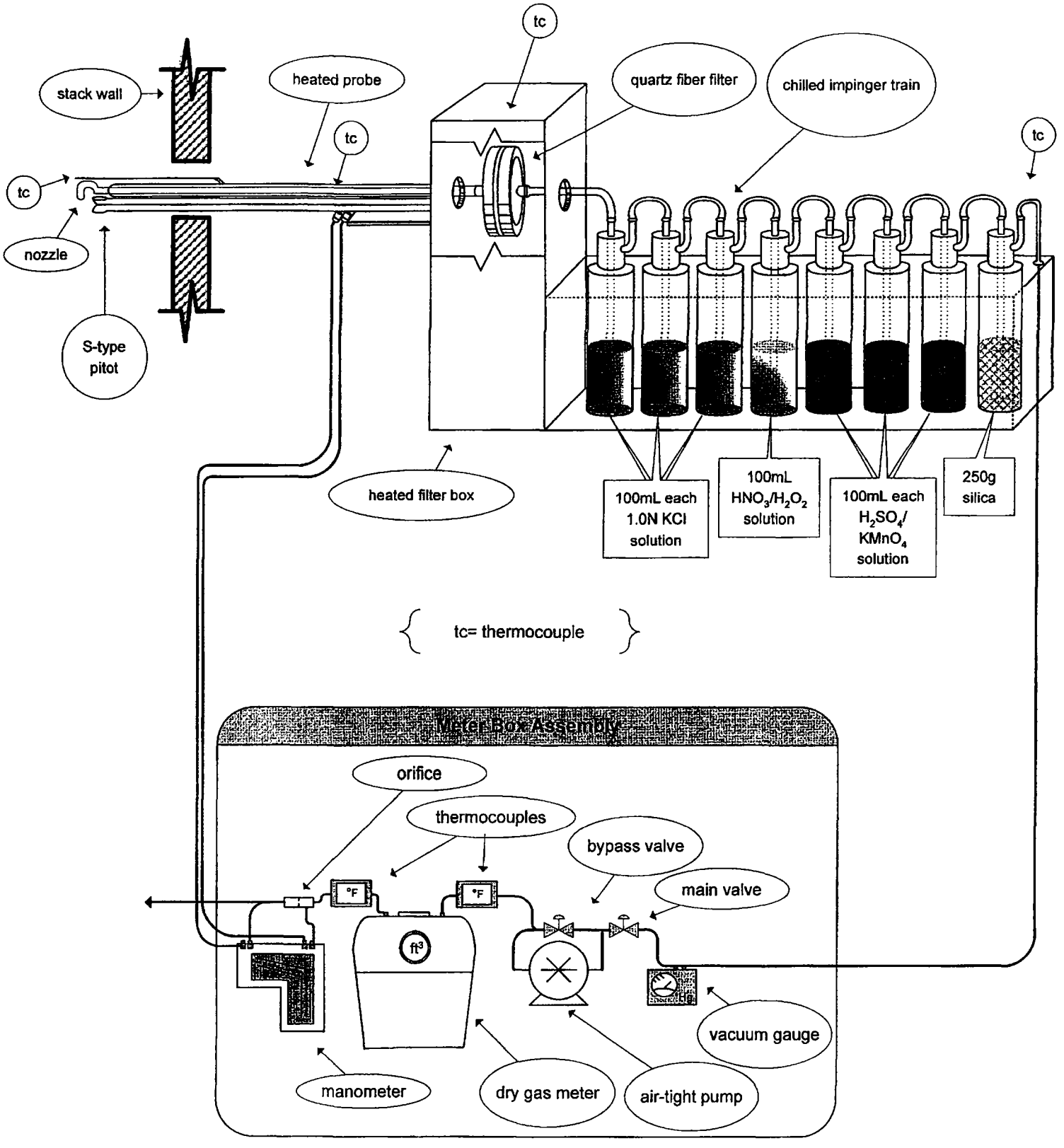
Method 0030 (VOST) Sample Recovery Scheme



EPA Method 29 (without Hg) sampling train schematic

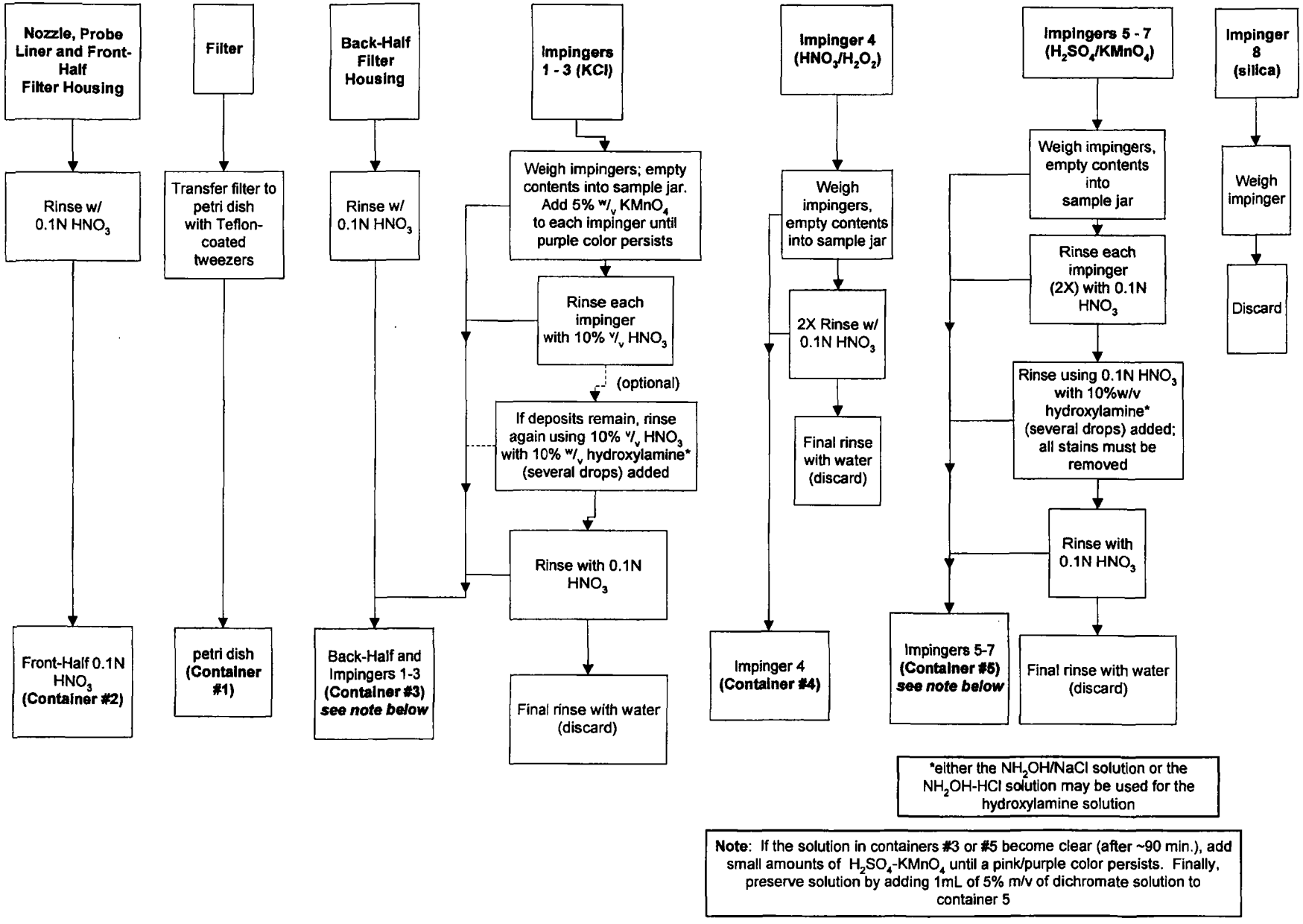


EPA Method 29 Recovery (no Hg or particulate determination)



EPA Methods 1-5 and Ontario Hydro
Speciated Mercury
sampling train schematic

ASTM D 6784 - 02 (Ontario Hydro Method)

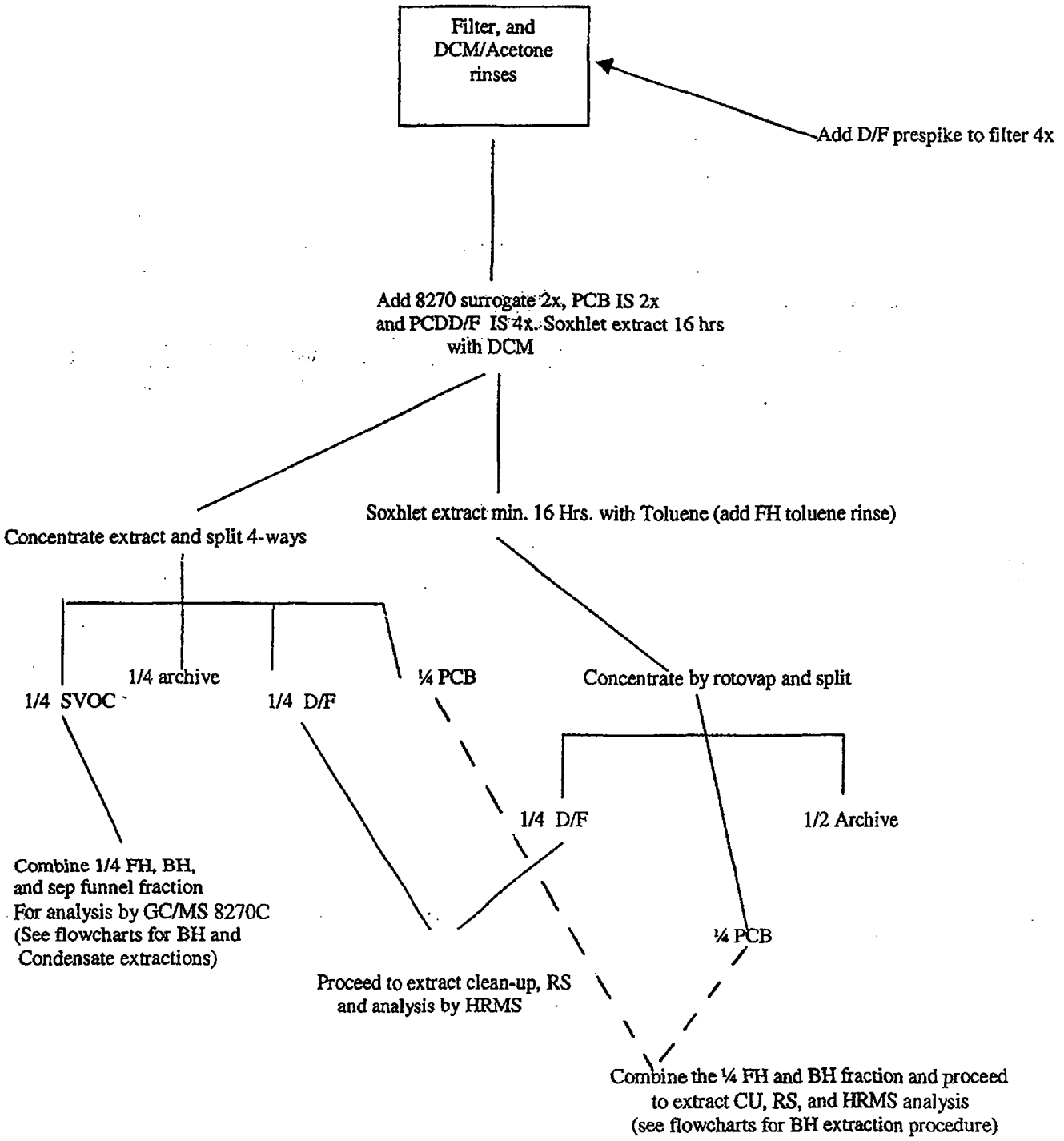


Appendix E

Analytical Flow Charts

Flowchart -16

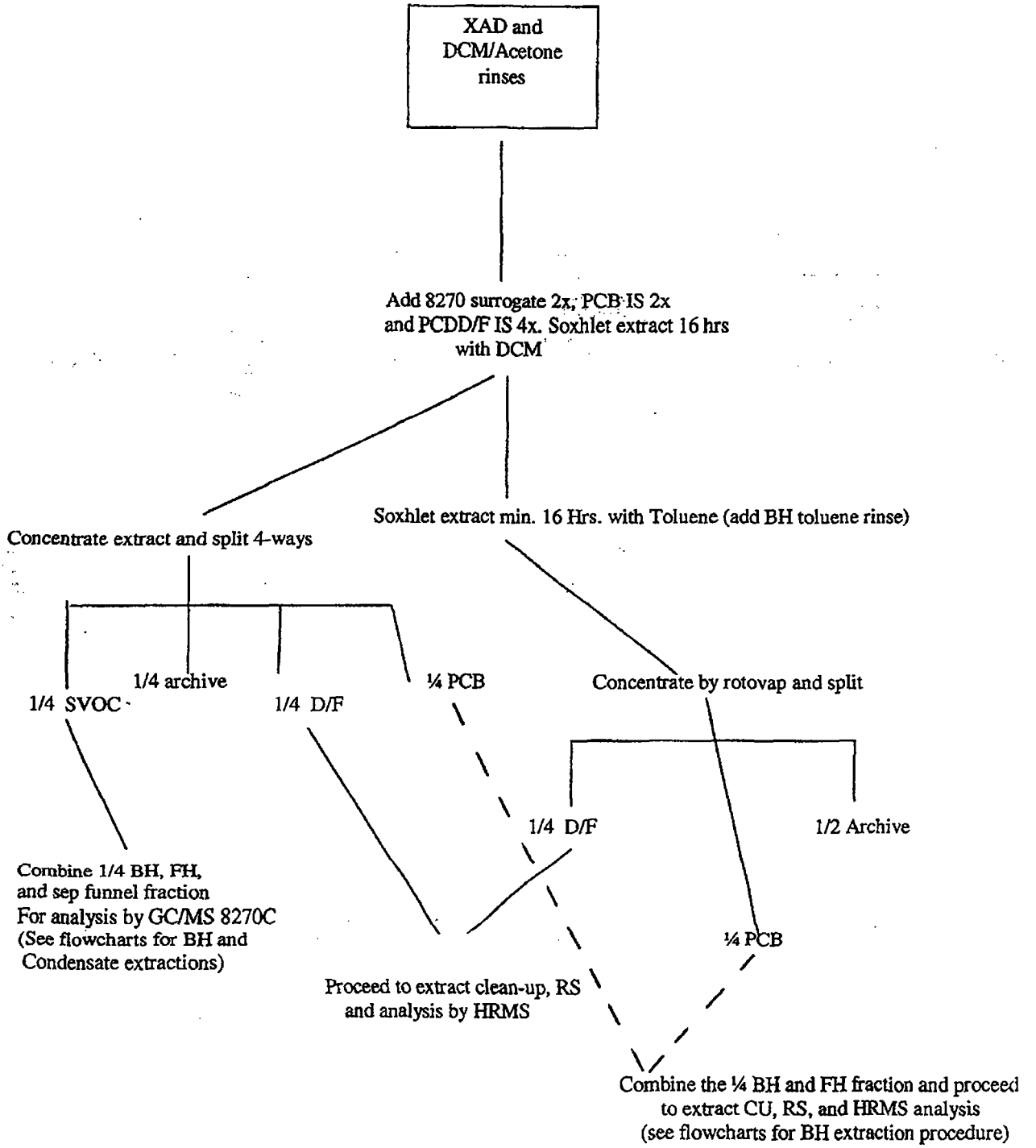
PCB, SVOC and D/F split
Front Half



Note- The toluene rinse of the FH must be recovered separately from the acetone and DCM rinses for the combined PCB, SVOC and D/F train.
Note- The D/F pre-spike surrogate was added to the BH XAD fraction prior to shipment to the field.
Note- The D/F analysis will be performed as FH & BH separate for 2 analytical fractions per train. The PCB and SVOC will be performed as all fractions combined for a single analytical fraction per train.

Flowchart -17

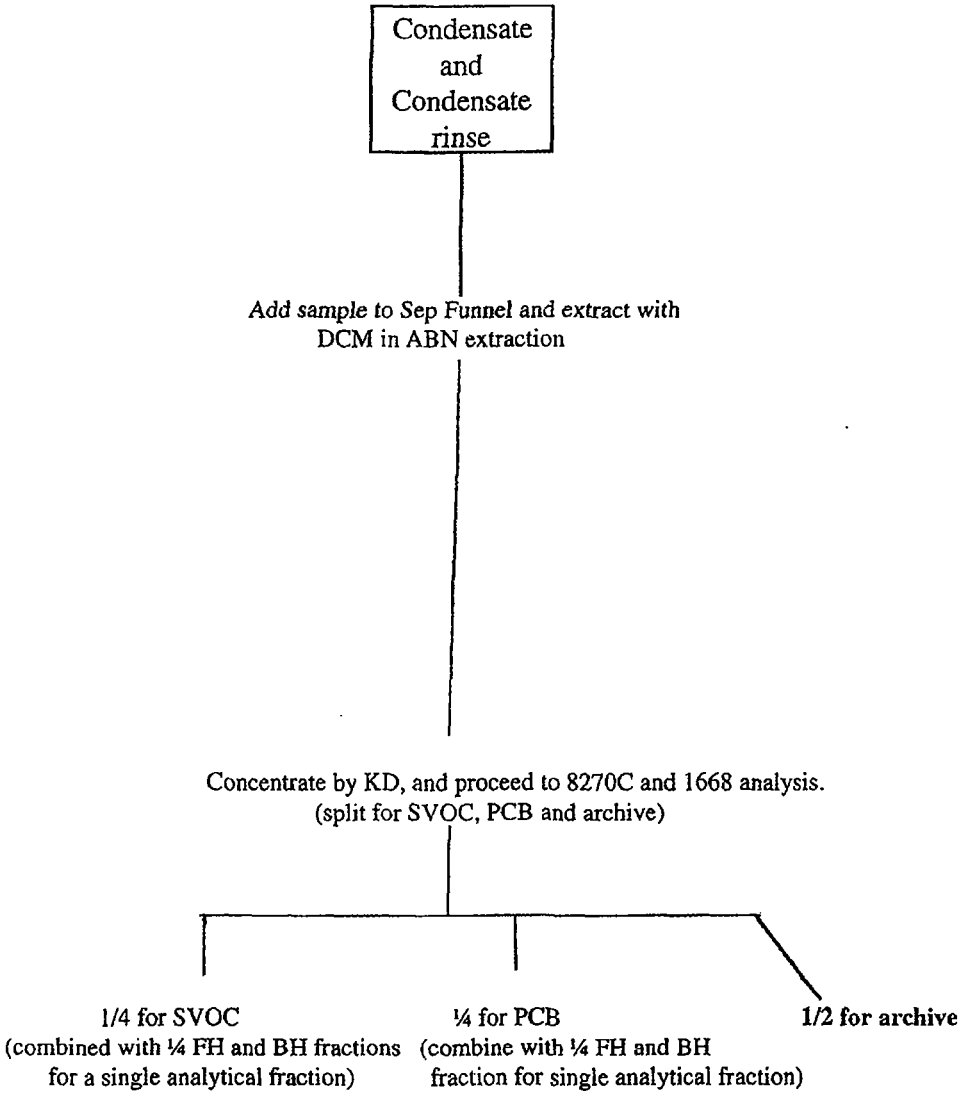
PCB, SVOC and D/F split
Back Half



Note- The toluene rinse of the BH must be recovered separately from the acetone and DCM rinses for the combined PCB, SVOC and D/F train.
Note- The D/F pre-spike surrogate was added to the BH XAD fraction prior to shipment to the field.
Note- The D/F analysis will be performed as FH & BH separate for 2 analytical fractions per train. The PCB and SVOC will be performed as all fractions combined for a single analytical fraction per train.

Flowchart-30

Extraction Diagram for SVOCs by 8270C and PCB by 1668 from Condensate Fraction



Note- The condensate fraction is not combined with the extracts for PCDD/F analysis.
Note- The condensate fraction is not spiked with SVOC or PCB extraction surrogates because it is combined with the soxhlet fraction that have been spiked.

Appendix F

Waste Feed, Spiking, and Raw Material Sampling and Analysis Plan

2007 Test Burn
Waste Feed, Spiking, and Raw Material Sampling and Analysis Plan

1 Background

This plan describes sampling and analysis of the waste feeds, spiking materials, and raw materials used to establish permit limits during the 2007 Test Burn.

The field samples taken and the amounts of spiking materials fed during the Test Burn runs are used to determine the chemistry for the waste fed during the Test Burn. Not all waste is analyzed for all of the incineration parameters and POHCs. Where waste is not analyzed, that waste stream is assumed to contain none of that constituent. This is a conservative approach in the determination of Destruction Removal Efficiency and amounts of metals fed during the Test Runs.

2 Waste Feed Description

2.1 Containers

Containers, mostly 55-gallon drums, are fed to the front wall of the incinerator kiln through an elevator and slide gate. Containerized waste that is fed to the incinerator usually contains solids contaminated with organic material. Sometimes the waste will consist of debris that is difficult to sample. In that case an estimate of the percentages of the different types of material in the waste will be made and those percentages together with analyses for typical types of material will be used to calculate an analysis. The WAP describes this method in more detail.

Because of the difficulty of sampling drums, it is not planned to resample containers during the test. The sampling as required by the WAP will be used to determine the Btu/lb content of containers fed.

HCE, PCB, MCB, halogen, and metals content of the containerized waste will be taken as zero. Note that lead, chromium, and HCE will be fed to the incinerator through this port as preweighed bags of HCE, lead, and chromium will be placed on top of the containers.

2.2 Bulk Solids

Bulk Solids are fed to the incinerator by an Apron Feeder that feeds through a kiln feed chute. Bulk solids are solid waste and may include dirt, mud, and debris. During the Test Runs, a shovel will be used to take a grab sample

from the Apron Feeder every 15 minutes. These samples will be composited in a 5 gallon pail with a separate composite and duplicate composite taken for each test run.

The composite will be analyzed for Btu/lb, total halogens, and metals. HCE, PCB and MCB content in the bulk solid waste will be taken as zero.

2.3 Kiln Pumpable Waste Streams

The sludge, direct feed, blend waste, and kiln aqueous ports feed pumpable wastes to the kiln. Sludge, direct feed, and kiln aqueous wastes are fed through nozzles in the kiln front wall. Blend waste is fed to the kiln through the front wall burner. These wastes are pumpable and are liquid with, in some cases, small amounts of suspended solids.

Grab samples will be collected during each run from sample taps in accordance with Method S004 ("Sampling and Analysis Methods for Hazardous Waste Incineration", February 1982). The sample tap is opened and the line is flushed with the material being collected. The flush is then discarded into a container and managed appropriately, and then the specified sub sample is collected. This ensures that the collected material is representative of the stream. A composite sample and a duplicate composite will be taken with approximately 100 ml of liquid collected and placed in the composite jar every 15 minutes. The composite samples will be stored in coolers until they can be transferred to the laboratory.

Samples of pumpable waste streams will be analyzed for Btu/lb., total halogens, metals, heat content, viscosity, and PCB. MCB and HCE in the pumpable waste streams will be assumed to be zero.

2.4 Afterburner Pumpable Waste Streams

Aqueous and blend liquid waste streams are fed into the North and South sides of the afterburner. The aqueous waste feeds through a nozzle in the North wall of the afterburner chamber and also a nozzle in the South wall of the afterburner. Blend waste feeds into the North afterburner burner and also through the South afterburner burner. These wastes are pumpable and are liquid with, in some cases, small amounts of suspended solids.

Samples will be collected from each afterburner feed port in the manner described for kiln pumpable waste streams.

Samples of afterburner liquid waste streams will be analyzed for Btu/lb, total halogen, metals, heat content, viscosity, and PCB. MCB and HCE in the pumpable waste streams will be assumed to be zero.

2.5 Gas Cylinder Feed

Gas content from gas cylinders is fed to the South afterburner burner. If gas cylinders are fed to the incinerator during the test, determination of incinerator parameters will be made as directed by the WAP.

Metals and POHC analyses for the gas from the cylinders will be assumed to be zero.

3 Spiking Samples

Lead, chromium, mercury, MCB, PCB, and HCE will be added to the incinerator during the Test Burn. Lead (as lead oxide), chromium (as chromium green pigment), and HCE will be added as preweighed bags placed on top of the containers being fed during the Test runs. Chromium acetate solution, mercuric acetate solution, and MCB will be pumped from 55-gallon drums into the incinerator pumpable liquid waste feed streams.

Supplier certificates of analysis will be used for the composition of the solid metal spiking materials, MCB, and HCE. Blend waste feed samples will be sampled and analyzed to determine the analysis of PCB in the blend waste. Samples will be taken from each chromium acetate drum and analyzed for chromium content. Samples will also be taken from each mercuric acetate drum and analyzed for mercury.

Spiking materials will be assumed not to contain other metals or POHCs.

4 Raw Materials

One fuel oil sample will be taken during the Test Burn. This sample will be analyzed for the WAP required incineration parameters.

Fuel Oil will be assumed not to contain POHCs.

5 Analyses

The analytical methods for analyses of the field samples will be performed according to the methods listed in Summary Table F-2.

Except for analyses of chrome acetate and mercuric acetate, analyses will be done by on site Aragonite laboratory using laboratory procedures described in the WAP. The analyses of chrome acetate and mercuric acetate samples will be conducted by an outside laboratory using the method indicated in the summary table.

6 Summary Tables

Table F-1 contains a summary of the analyses that will be used for calculating the weight of waste feed constituents. Table F-2 summarizes the sampling and analytical program for field sampling.

7 Instructions for Samplers

A Protocol for Test Burn Waste Sampling is attached to this Appendix. Each drum of spiking solution will be sampled before Test Burn.

Table F-1
Analyses Used For Calculating Weight of Waste Feed Constituents

Waste Stream	Analyses to be taken as zero	Analyses to be obtained from WAP sampling	Analyses by Supplier Certificate	Analyses to be obtained from Test Run sampling	Sample Method
Containers	Total Halogens, PCB, MCB, HCE, Metals (As, Be, Cd, Cr, Pb, Hg)	Btu Content,	None	Btu Content	WAP
Bulk Solids	HCE, MCB, PCB	None	None	Btu Content, Total Halogens, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	Grab sample at Apron Feeder SW846 Method S-007 1/15 min
Kiln Pumpable Waste Streams	HCE, MCB	None	None	Viscosity, Specific Gravity, Btu Content, Total Halogens, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	SW-846 Method S004 1/15 min during test
Afterburner Pumpable Waste Streams	HCE, MCB	None	None	Viscosity, Specific Gravity, Btu Content, Total Halogens, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	SW-846 Method S004 1/15 min during test
Fuel Oil	Total Halogens, HCE, MCB, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	None	None	Specific Gravity, Btu/lb	Grab Sample 1/ Test Burn
Poly Vinyl Chloride	Btu/lb, HCE, MCB, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	None	None	Total Halogen	Grab Sample 1/Gaylord

Waste Stream	Analyses to be taken as zero	Analyses to be obtained from WAP sampling	Analyses by Supplier Certificate	Analyses to be obtained from Test Run sampling	Sample Method
Lead Oxide solid	Btu/lb, Total Halogens, HCE, MCB, PCB, Metals (As, Be, Cd, Cr, Hg)	None	Lead	None	None
Chromium Oxide solid	Btu/lb, Total Halogens, HCE, MCB, PCB, Metals (As, Be, Cd, Pb, Hg)	None	Chromium	None	None
Mercuric Acetate	Btu/lb, Total Halogens, HCE, MCB, PCB, Metals (As, Be, Cd, Cr, Pb)	None	None	Mercury	Coliwasa, 1/drum
Chromium Acetate	Btu/lb, Total Halogens, HCE, MCB, PCB, Metals (As, Be, Cd, Pb, Hg)	None	None	Chromium	Coliwasa, 1/drum
MCB	Btu/lb, Total Halogens, HCE, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	None	MCB	None	None
PCB	Btu/lb, Total Halogens, HCE, MCB, Metals (As, Be, Cd, Cr, Pb, Hg, Be)	None	None	PCB	SW-846 Method S004 1/15 min during test
HCE	Btu/lb, Total Halogens, MCB, PCB, Metals (As, Be, Cd, Cr, Pb, Hg)	None	HCE	None	None

Table F-2
Sampling and Analytical Program Summary for Waste Feed and Process Streams

Waste Feed and Process Streams	Sampling Method (c)	Sampling Frequency	Analytical Parameters	Analytical Method	Total Samples for Analysis		
					Total Field	Lab QC	Total
Waste Solids (a)	Scoop (S007)	(d) (e)	Total Chlorides	EPA M 5050 / 9056	6	2	8
			Heat Content	ASTM D 240	6	2	8
			Metals	EPA M 6010B/7470A/7471A	6	4	10
Pumpable Wastes (b)	Tap (S004)	(e)	Viscosity	ASTM D 2983	48	16	64
			Total Chlorides	EPA M 5050 / 9056	48	16	64
			Heat Content	ASTM D 240	48	16	64
			Metals	EPA M 6010B/7470A/7471A	48	32	80
			PCBs	EPA M 8082	48	16	64
Fuel Oil	Tap (S004)	(f)	Viscosity	ASTM D 2983	1	1	2
			Total Chlorides	EPA M 5050 / 9056	1	1	2
			Heat Content	ASTM D 240	1	1	2
Spiking Solutions	Coliwasa	(g)	Chromium	EPA 6010B	25	3	28
			Mercury	EPA 7470A	4	1	5

(a) Waste solids (2 streams) include containerized solids and apron feed solids.
(b) Pumpable wastes (8 streams) include sludge, direct feed, aqueous waste and liquid blend fed to the kiln, North ABC liquid blend and aqueous wastes, and South ABC liquid blend and aqueous wastes .
(c) Sampling method designations from EPA-600/8-84-002, February 1984.
(d) Containers will be prepared and characterized prior to the Test Burn as per the facility's WAP. The total samples for analysis column refers to apron feed solids. One composite will be analyzed for each Test Run.
(e) One grab sample for each waste stream every 15 minutes; one composite sample for each waste stream per run, and one duplicate per waste stream
(f) One grab sample will be collected from the feed tank.
(g) Each drum of chromium acetate and mercuric acid will be sampled.

Protocol for Test Burn Sampling of Waste Streams

This protocol describes procedures that will be followed for waste feed sampling during the Trial Burn.

Safety Precautions

Normal plant PPE (i.e., hard hat, safety glasses, steel toed shoes, gloves) are required in the sampling areas. Appropriate respiratory protection is also required when feed samples are being collected.

Sampling Locations

Front wall blend:	At the blend sample header at the front wall.
Direct Burn:	At the direct burn sample port at the front wall.
Sludge:	At the sludge port at the front wall
Kiln Aqueous	At the kiln aqueous port at the front wall
North ABC blend:	At the north blend sample port of the afterburner.
North ABC Aqueous:	At the north aqueous sample port of the afterburner.
South ABC blend:	At the south blend sample port of the afterburner.
South ABC Aqueous:	At the south aqueous sample port of the afterburner.
Fuel Oil:	One fuel oil sample taken from port at front wall.
Solids Feed:	At the apron feeder.

Apparatus

Liquids:	500 mL beaker 5 gallon plastic buckets 1 gallon glass jars ice chest blue ice absorbent pads
Solids:	250 mL beaker shovel plastic scoops 1 gallon glass jars ice chest blue ice absorbent pads

Paper work

Sample labels
Sample log sheets

Waste Feed Sample Procedure

Pumpable Waste Feed

For each test run an appropriate amount of liquid (100mL) will be collected at 15-minute intervals from liquid sampling ports on the pumpable feed lines. At each interval a beaker is filled from the sampling port and the contents are poured into a 1 gallon composite bottle. In addition one duplicate sample composite will be taken from each pumpable feed line.

A 100 mL grab sample to be added to a 1 gallon compositing jar for viscosity, specific gravity, Total Halogens, PCB, and Metals (As,Be,Cd,Cr,Pb,Hg) analysis. A separate composite is to be collected for each Test Run.

Liquid sampling ports consist of a vertical tube attached to the horizontal feed line. The tube has valves at the top and bottom. The top valve opens the sample tube to the feed line. The bottom valve allows sample to drain for sample collection.

NOTE: CLOGGING CHECK: At the very beginning of the day before any setup at the sampling ports, the samplers must ensure that the ports are not clogged. Open the valve to ensure even flow of liquid. If any port is plugged, notify the sampling supervisor immediately. Sampling ports should then be tested once again 15 minutes prior to actual sampling. If any port is plugged notify the sampling supervisor immediately. The sampling supervisor should cross check with the CBO to see if waste is being pumped in those lines.

Samples are collected as follows:

1. Place a 5 gallon plastic waste bucket under the sampling port and open the bottom valve to ensure tube is empty.
2. Close the bottom valve.
3. Open the top valve to fill the tube with liquid.
4. Close the top valve.
5. Place a 500 mL beaker under the sampling tube and open the bottom valve. Collect about 200 mL to rinse the beaker. Discard the rinse liquid into the 5 gallon plastic waste bucket.
6. Place the 500 mL beaker back under the tube and drain the rest of the liquid from the tube.

7. Pour 100 mL of liquid into the 1 gallon compositing jar.
8. Discard the remainder of liquid into the 5 gallon waste bucket.

Sample logs will contain sample ID's, sample time and date, sample volume and sampler's initials.

Solid Waste Feed

For each test run a 250mL grab sample will be taken at 15-minute intervals from the Apron Feeder. At each interval the grab sample will be added to a one gallon composite bottle. In addition one duplicate composite sample will be taken from the Apron feeder.

Solid samples are to be collected at the apron feeder. A 250 mL grab sample to be added to a 1-gallon compositing jar for Total Halogens, PCB,and Metals (As,Be,Cd,Cr,Pb,Hg) analysis. A separate composite is to be collected for each Test Run.

1. Open the apron feeder door.
2. Grab a shovel full of solids.
3. Bring the shovel blade to the apron feeder door, but still in the apron feeder enclosure.
4. Fill a 250 mL beaker by transferring the solids from the shovel blade to the 250 mL beaker with a plastic scoop.
5. Transfer contents of the 250 mL beaker into a 1-gallon glass composite jar designated for that run.
6. Empty the remaining solids from the shovel back into the apron feeder.

   Sampling logs will contain sample ID's, sample time and date, sample volume and the sampler's initials.

Sample Preservation

Ice chests with blue ice will be placed at each sampling location. Compositing jars should be returned to the coolers immediately after the addition of each grab sample. At the end of each run sample coolers are to be delivered to the lab. The lab will log the samples in and preserve them as required and prepare any sample splits if required.

Sampling Time

Samples will be taken every 15 minutes during the test run with the first set of samples taken 15 minutes after the Test Run starts. Should a waste feed cutoff occur, and stack sampling stopped, the Control Board operator will

announce the stop of sampling. Do not count time when the stack is not being sampled as part of the fifteen minutes between samples.

As an example if a sample was taken at 1:35 and waste was stopped between 1:47 and 1:52, the next sample would be taken at 1:55.